[FIG.1]

TRANSMIT SIGNAL

101 CONTROL SECTION

102 SPREADING SECTION

103 IFFT SECTION

104 GI INSERTION SECTION

105 GI INSERTION SECTION

106 GI INSERTION SECTION

107 SELECTION SECTION

RETRANSMISSION INFORMATION

[FIG.2]

FREQUENCY

#4m m'th chip of signals 3k+1 through 4k of time T

m'th chip of signals 3k+1 through 4k of time 2T

m'th chip of signals 3k+1 through 4k of time 3T

#3m+1 1st chip of signals 3k+1 through 4k of time T

1st chip of signals 3k+1 through 4k of time 2T

1st chip of signals 3k+1 through 4k of time 3T

#3m m'th chip of signals 2k+1 through 3k of time T

m'th chip of signals 2k+1 through 3k of time 2T

m'th chip of signals 2k+1 through 3k of time 3T

#2m+1 1st chip of signals 2k+1 through 3k of time T

1st chip of signals 2k+1 through 3k of time 2T

1st chip of signals 2k+1 through 3k of time 3T

#2m m'th chip of signals k+1 through 2k of time T

m'th chip of signals k+1 through 2k of time 2T

m'th chip of signals k+1 through 2k of time 3T

#m+1 1st chip of signals k+1 through 2k of time T

1st chip of signals k+1 through 2k of time 2T

1st chip of signals k+1 through 2k of time 3T

#m m'th chip of signals 1 through k of time T

m'th chip of signals 1 through k of time 2T

m'th chip of signals 1 through k of time 3T

#1 1st chip of signals 1 through k of time T

1st chip of signals 1 through k of time 2T

1st chip of signals 1 through k of time 3T

TIME

[FIG.3]

START

ST301 RETRANSMISSION?

ST302 RETRANSMISSION COUNT = 1?

ST303 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/8 OF EFFECTIVE SYMBOL LENGTH

ST304 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/4 OF EFFECTIVE SYMBOL LENGTH

ST305 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 3/8 OF EFFECTIVE SYMBOL LENGTH

ST306 OUTPUT

END

[FIG.4]

EFFECTIVE SYMBOLS

[FIG.5]

EFFECTIVE SYMBOLS

[FIG.6]

EFFECTIVE SYMBOLS

[FIG.7]

TRANSMIT SIGNAL

101 CONTROL SECTION

701 TURBO CODING SECTION

SYSTEMATIC BIT DATA

PARITY BIT DATA

702 P/S CONVERSION SECTION

703 MODULATION SECTION

102 SPREADING SECTION

103 IFFT SECTION

104 GI INSERTION SECTION

105 GI INSERTION SECTION

106 GI INSERTION SECTION

107 SELECTION SECTION

RETRANSMISSION INFORMATION

INFORMATION INDICATING SYSTEMATIC BIT DATA OR PARITY BIT DATA

[FIG.8]

START

ST801 SYSTEMATIC BIT DATA?

ST802 RETRANSMISSION?

ST803 RETRANSMISSION COUNT = 1?

ST804 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/8 OF EFFECTIVE SYMBOL LENGTH

ST805 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/4 OF EFFECTIVE SYMBOL LENGTH

ST806 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 3/8 OF EFFECTIVE SYMBOL LENGTH

ST807 OUTPUT

END

[FIG.9]

TRANSMIT SIGNAL

DELAY DISTRIBUTION INFORMATION

101 CONTROL SECTION

901 TURBO CODING SECTION

SYSTEMATIC BIT DATA

PARITY BIT DATA

902 P/S CONVERSION SECTION

903 MODULATION SECTION

102 SPREADING SECTION

103 IFFT SECTION

104 GI INSERTION SECTION

105 GI INSERTION SECTION

106 GI INSERTION SECTION

THRESHOLD VALUE

107 SELECTION SECTION

RETRANSMISSION INFORMATION

DELAY DISTRIBUTION INFORMATION

[FIG.10]

RECEIVED SIGNAL

1001 DELAY CIRCUIT

1002 SUBTRACTION CIRCUIT

1003 ABSOLUTE VALUE GENERATION CIRCUIT

1004 AVERAGING CIRCUIT

DELAY DISTRIBUTION INFORMATION

[FIG.11]

START

ST1101 RETRANSMISSION?

ST1102 RETRANSMISSION COUNT = 1?

ST1103 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/8 OF EFFECTIVE SYMBOL LENGTH

ST1104 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/4 OF EFFECTIVE SYMBOL LENGTH

ST1105 DELAY DISTRIBUTION < THRESHOLD VALUE?

ST1106 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 3/8 OF EFFECTIVE SYMBOL LENGTH

ST1107 OUTPUT

END

[FIG.12]

1201 COUNTER SECTION

1202 DELAY SECTION

1203 SUBTRACTION SECTION

INFORMATION INDICATING TRANSMISSION TIME INTERVAL

TRANSMIT SIGNAL

101 CONTROL SECTION

102 SPREADING SECTION

103 IFFT SECTION

104 GI INSERTION SECTION

105 GI INSERTION SECTION

106 GI INSERTION SECTION

107 SELECTION SECTION

THRESHOLD VALUE

RETRANSMISSION INFORMATION

[FIG.13]

START

ST1301 RETRANSMISSION?

ST1302 RETRANSMISSION COUNT = 1?

ST1303 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/8 OF EFFECTIVE SYMBOL LENGTH

ST1304 TRANSMISSION TIME INTERVAL ≥ THRESHOLD VALUE?

ST1305 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/4 OF EFFECTIVE SYMBOL LENGTH

ST1306 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 3/8 OF EFFECTIVE SYMBOL LENGTH

ST1307 OUTPUT

END

[FIG.14]

TRANSMIT SIGNAL

101 CONTROL SECTION

102 SPREADING SECTION

103 IFFT SECTION

104 GI INSERTION SECTION

105 GI INSERTION SECTION

106 GI INSERTION SECTION

107 SELECTION SECTION

RETRANSMISSION INFORMATION

INFORMATION INDICATING BAND USAGE SITUATION

[FIG.15]

START

ST1501 RETRANSMISSION?

ST1502 RETRANSMISSION COUNT = 1?

ST1503 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/8 OF EFFECTIVE SYMBOL LENGTH

ST1504 USED BAND RATIO ≤ THRESHOLD VALUE?

ST1505 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/4 OF EFFECTIVE SYMBOL LENGTH

ST1506 SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 3/8 OF EFFECTIVE SYMBOL LENGTH

ST1507 OUTPUT

END

[FIG.16]

TRANSMIT SIGNAL

1601 CONTROL SECTION

1602 SPREADING SECTION

RETRANSMISSION INFORMATION

1603 S/P CONVERSION SECTION

1604 P/S CONVERSION SECTION

1605 IFFT SECTION

1606 GI INSERTION SECTION

[FIG.17]

START

ST1701 RETRANSMISSION?

ST1702 RETRANSMISSION COUNT = 1?

ST1703 NO REARRANGEMENT

ST1704 REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 THROUGH G4

ST1705 REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 AND G3

ST1706 IFFT PROCESSING

END

[FIG.21]

FREQUENCY

#4m m'th chip of signals 3k+1 through 4k of time T

m'th chip of signals 3k+1 through 4k of time 2T

m'th chip of signals 3k+1 through 4k of time 3T

#3m+1 1st chip of signals 3k+1 through 4k of time T

1st chip of signals 3k+1 through 4k of time 2T

1st chip of signals 3k+1 through 4k of time 3T

#3m m'th chip of signals 2k+1 through 3k of time T

m'th chip of signals 2k+1 through 3k of time 2T

m'th chip of signals 2k+1 through 3k of time 3T

#2m+1 1st chip of signals 2k+1 through 3k of time T

1st chip of signals 2k+1 through 3k of time 2T

1st chip of signals 2k+1 through 3k of time 3T

#2m m'th chip of signals k+1 through 2k of time T

m'th chip of signals k+1 through 2k of time 2T

m'th chip of signals k+1 through 2k of time 3T

#m+1 1st chip of signals k+1 through 2k of time T

1st chip of signals k+1 through 2k of time 2T

1st chip of signals k+1 through 2k of time 3T

#m m'th chip of signals 1 through k of time T

m'th chip of signals 1 through k of time 2T

m'th chip of signals 1 through k of time 3T

#1 1st chip of signals 1 through k of time T

1st chip of signals 1 through k of time 2T

1st chip of signals 1 through k of time 3T

TIME

[FIG.22]

FREQUENCY

#4m m'th chip of signals k+1 through 2k of time T

m'th chip of signals k+1 through 2k of time 2T

m'th chip of signals k+1 through 2k of time 3T

#3m+1 1st chip of signals k+1 through 2k of time T
1st chip of signals k+1 through 2k of time 2T
1st chip of signals k+1 through 2k of time 3T
#3m m'th chip of signals 1 through k of time T
m'th chip of signals 1 through k of time 2T
m'th chip of signals 1 through k of time 3T

#2m+1 1st chip of signals 1 through k of time T
1st chip of signals 1 through k of time 2T
1st chip of signals 1 through k of time 3T
#2m m'th chip of signals k+1 through 2k of time T
m'th chip of signals k+1 through 2k of time 2T
m'th chip of signals k+1 through 2k of time 3T

#m+1 1st chip of signals k+1 through 2k of time T
1st chip of signals k+1 through 2k of time 2T
1st chip of signals k+1 through 2k of time 3T
#m m'th chip of signals 1 through k of time T
m'th chip of signals 1 through k of time 2T
m'th chip of signals 1 through k of time 3T

#1 1st chip of signals 1 through k of time T
1st chip of signals 1 through k of time 2T
1st chip of signals 1 through k of time 3T
TIME

[FIG.23]

FREQUENCY

#4m m'th chip of signals 1 through k of time T

m'th chip of signals 1 through k of time 2T

m'th chip of signals 1 through k of time 3T

#3m+1 1st chip of signals 1 through k of time T

1st chip of signals 1 through k of time 2T

1st chip of signals 1 through k of time 3T

#3m m'th chip of signals 1 through k of time T

m'th chip of signals 1 through k of time 2T

m'th chip of signals 1 through k of time 3T

#2m+1 1st chip of signals 1 through k of time T

1st chip of signals 1 through k of time 2T

1st chip of signals 1 through k of time 3T

#2m m'th chip of signals 1 through k of time T

m'th chip of signals 1 through k of time 2T

m'th chip of signals 1 through k of time 3T

#m+1 1st chip of signals 1 through k of time T

1st chip of signals 1 through k of time 2T

1st chip of signals 1 through k of time 3T

#m m'th chip of signals 1 through k of time T

m'th chip of signals 1 through k of time 2T

m'th chip of signals 1 through k of time 3T

#1 1st chip of signals 1 through k of time T

1st chip of signals 1 through k of time 2T

1st chip of signals 1 through k of time 3T

TIME

[FIG.24]

TRANSMIT SIGNAL

1601 CONTROL SECTION

2401 TURBO CODING SECTION

2402 P/S CONVERSION SECTION

1602 SPREADING SECTION

RETRANSMISSION INFORMATION

BIT INFORMATION

1603 S/P CONVERSION SECTION

1604 P/S CONVERSION SECTION

1605 IFFT SECTION

1606 GI INSERTION SECTION

[FIG.25]

START

ST2501 PARITY BIT DATA?

ST2502 RETRANSMISSION?

ST2503 NO REARRANGEMENT

ST2504 RETRANSMISSION COUNT = 1?

ST2505 REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 THROUGH G4

ST2506 REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 AND G3

ST2507 IFFT PROCESSING

END

[FIG.26]

TRANSMIT SIGNAL

1601 CONTROL SECTION

2601 TURBO CODING SECTION

2602 P/S CONVERSION SECTION

1602 SPREADING SECTION

RETRANSMISSION INFORMATION

CHANNEL QUALITY INFORMATION

1603 S/P CONVERSION SECTION

1604 P/S CONVERSION SECTION

1605 IFFT SECTION

1606 GI INSERTION SECTION

[FIG.27]

START

ST2701 RETRANSMISSION?

ST2702 RETRANSMISSION COUNT = 1?

ST2703 NO REARRANGEMENT

ST2704 REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 THROUGH G4

ST2705 IS CHANNEL QUALITY GOOD?

ST2706 REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 AND G3

ST2707 IFFT PROCESSING

END

[FIG.28]

2801 COUNTER SECTION

2802 DELAY SECTION

2803 SUBTRACTION SECTION

THRESHOLD VALUE

2804 SIZE COMPARISON SECTION

TRANSMIT SIGNAL

1601 CONTROL SECTION

1602 SPREADING SECTION

1603 S/P CONVERSION SECTION

1604 P/S CONVERSION SECTION

1605 IFFT SECTION

1606 GI INSERTION SECTION

RETRANSMISSION INFORMATION

[FIG.29]

START

ST2901 RETRANSMISSION?

ST2902 RETRANSMISSION COUNT = 1?

ST2903 NO REARRANGEMENT

ST2904 REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 THROUGH G4

ST2905 TRANSMISSION TIME INTERVAL ≥ THRESHOLD VALUE?

ST2906 REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 AND G3

ST2907 IFFT PROCESSING

END

[FIG.30]

BAND INFORMATION

TRANSMIT SIGNAL

1601 CONTROL SECTION

1602 SPREADING SECTION

1603 S/P CONVERSION SECTION

1604 P/S CONVERSION SECTION

1605 IFFT SECTION

1606 GI INSERTION SECTION

RETRANSMISSION INFORMATION

[FIG.31]

START

ST3101 RETRANSMISSION?

ST3102 RETRANSMISSION COUNT = 1?

ST3103 NO REARRANGEMENT

ST3104 REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 THROUGH G4

ST3105 MARGIN IN BAND?

ST3106 REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 AND G3

ST3107 IFFT PROCESSING

END

[FIG.32]

TRANSMIT SIGNAL

1601 CONTROL SECTION

3201 TURBO CODING SECTION

3202 P/S CONVERSION SECTION

1602 SPREADING SECTION

1603 S/P CONVERSION SECTION

1604 P/S CONVERSION SECTION

1605 IFFT SECTION

1606 GI INSERTION SECTION

SIGNAL INDICATING USED BAND

RETRANSMISSION INFORMATION

CHANNEL QUALITY INFORMATION

THRESHOLD VALUE α

THRESHOLD VALUE β

3203 SELECTION SECTION

3204 SIZE COMPARISON SECTION

SIGNAL INDICATING RETRANSMISSION ABORT

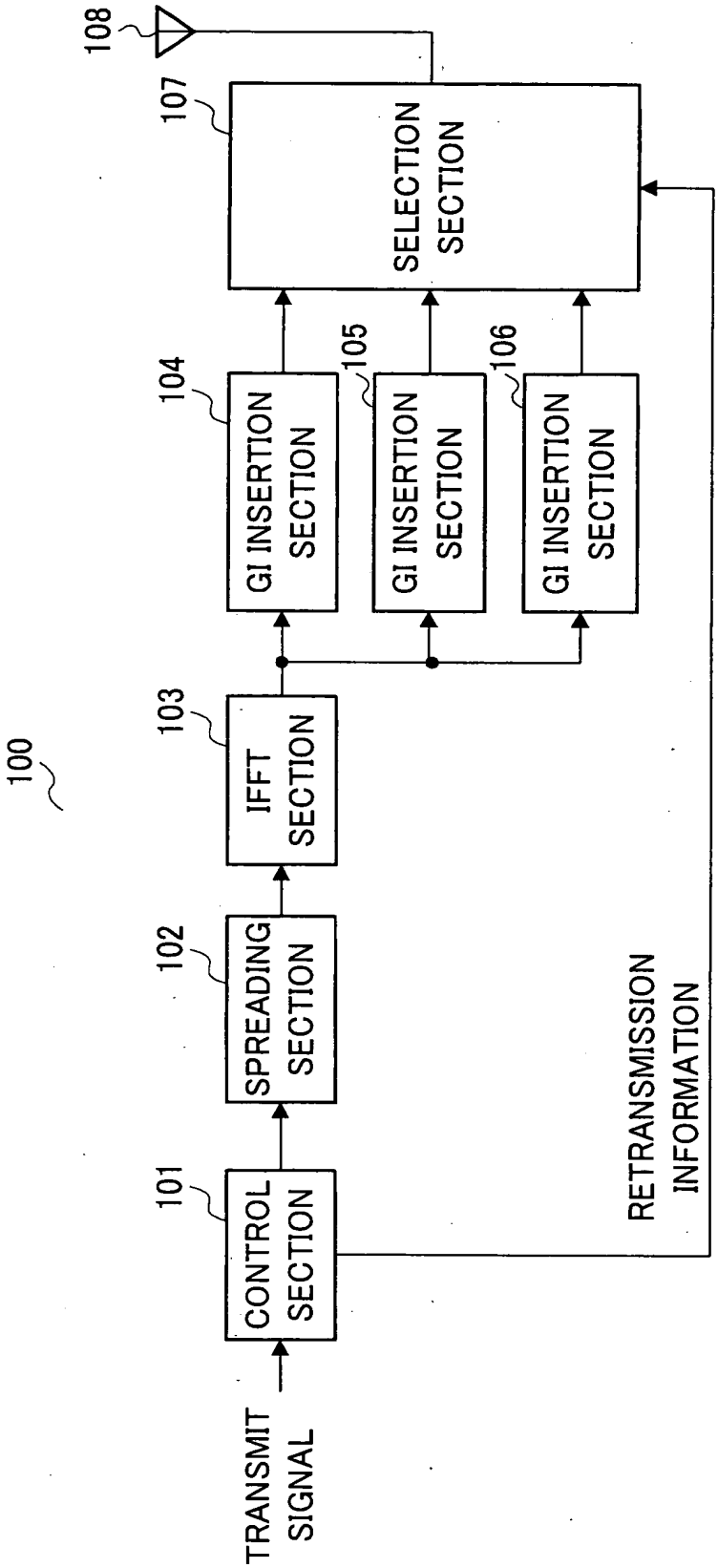
100
101
CONTROL SECTION
102
SPREADING SECTION
103
IFFT SECTION
104
GI INSERTION SECTION
105
GI INSERTION SECTION
106
GI INSERTION SECTION
107
SELECTION SECTION
108
TRANSMIT SIGNAL
RETRANSMISSION INFORMATION

FIG.1

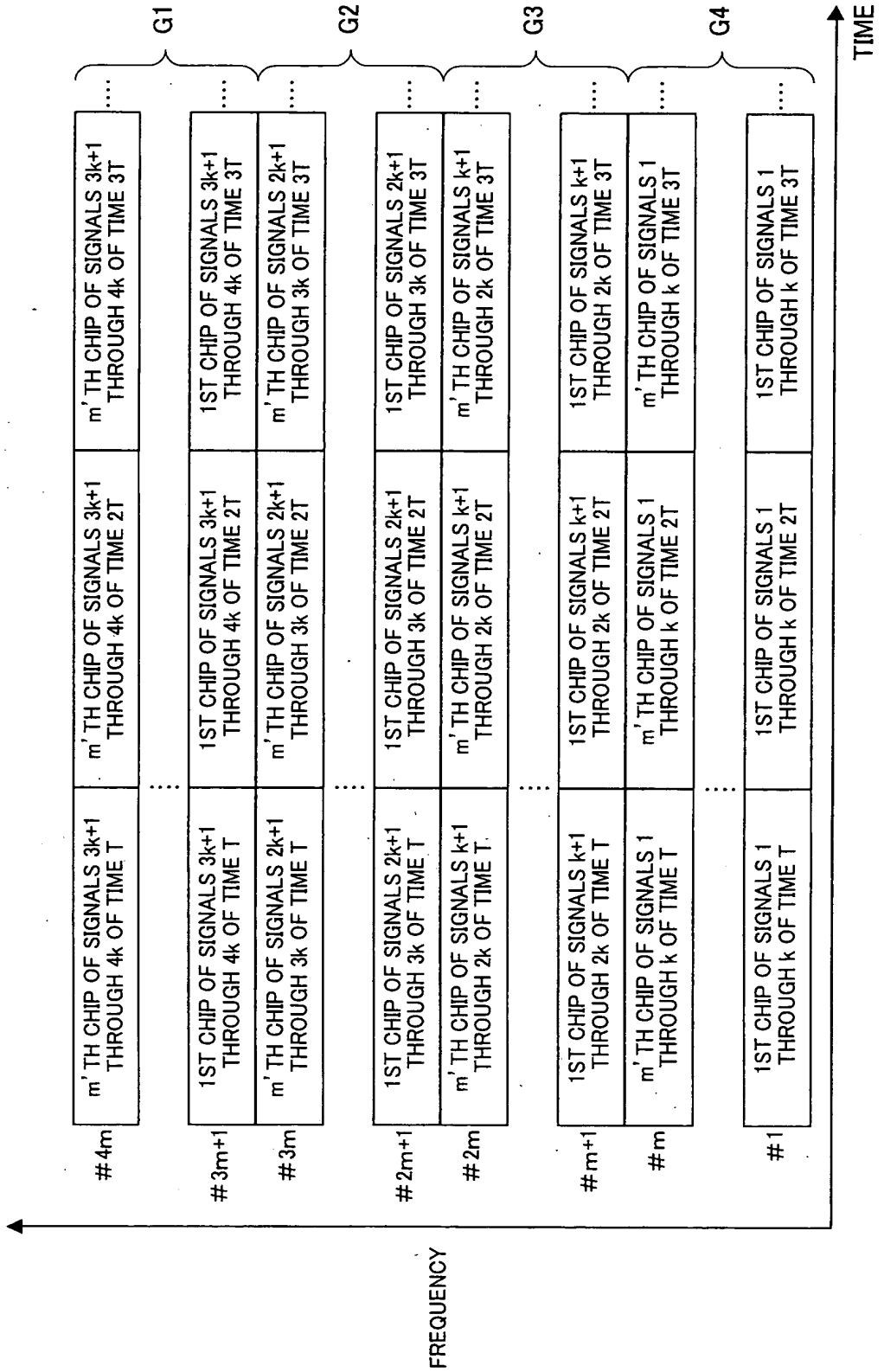
G1
G2
G3
G4
TIME
FREQUENCY
#4m
#3m+1
#3m
#2m+1
#2m
#m+1
#m
#1
m'TH CHIP OF SIGNALS 3k+1 THROUGH 4k OF TIME 3T
m'TH CHIP OF SIGNALS 3k+1 THROUGH 4k OF TIME 2T
m'TH CHIP OF SIGNALS 3k+1 THROUGH 4k OF TIME T
1ST CHIP OF SIGNALS 3k+1 THROUGH 4k OF TIME 3T
1ST CHIP OF SIGNALS 3k+1 THROUGH 4k OF TIME 2T
1ST CHIP OF SIGNALS 3k+1 THROUGH 4k OF TIME T
m'TH CHIP OF SIGNALS 2k+1 THROUGH 3k OF TIME 3T
m'TH CHIP OF SIGNALS 2k+1 THROUGH 3k OF TIME 2T
m'TH CHIP OF SIGNALS 2k+1 THROUGH 3k OF TIME T
1ST CHIP OF SIGNALS 2k+1 THROUGH 3k OF TIME 3T
1ST CHIP OF SIGNALS 2k+1 THROUGH 3k OF TIME 2T
1ST CHIP OF SIGNALS 2k+1 THROUGH 3k OF TIME T
m'TH CHIP OF SIGNALS k+1 THROUGH 2k OF TIME 3T
m'TH CHIP OF SIGNALS k+1 THROUGH 2k OF TIME 2T
m'TH CHIP OF SIGNALS k+1 THROUGH 2k OF TIME T
1ST CHIP OF SIGNALS k+1 THROUGH 2k OF TIME 3T
1ST CHIP OF SIGNALS k+1 THROUGH 2k OF TIME 2T
1ST CHIP OF SIGNALS k+1 THROUGH 2k OF TIME T
m'TH CHIP OF SIGNALS 1 THROUGH k OF TIME 3T
m'TH CHIP OF SIGNALS 1 THROUGH k OF TIME 2T
m'TH CHIP OF SIGNALS 1 THROUGH k OF TIME T
1ST CHIP OF SIGNALS 1 THROUGH k OF TIME 3T
1ST CHIP OF SIGNALS 1 THROUGH k OF TIME 2T
1ST CHIP OF SIGNALS 1 THROUGH k OF TIME T

FIG.2

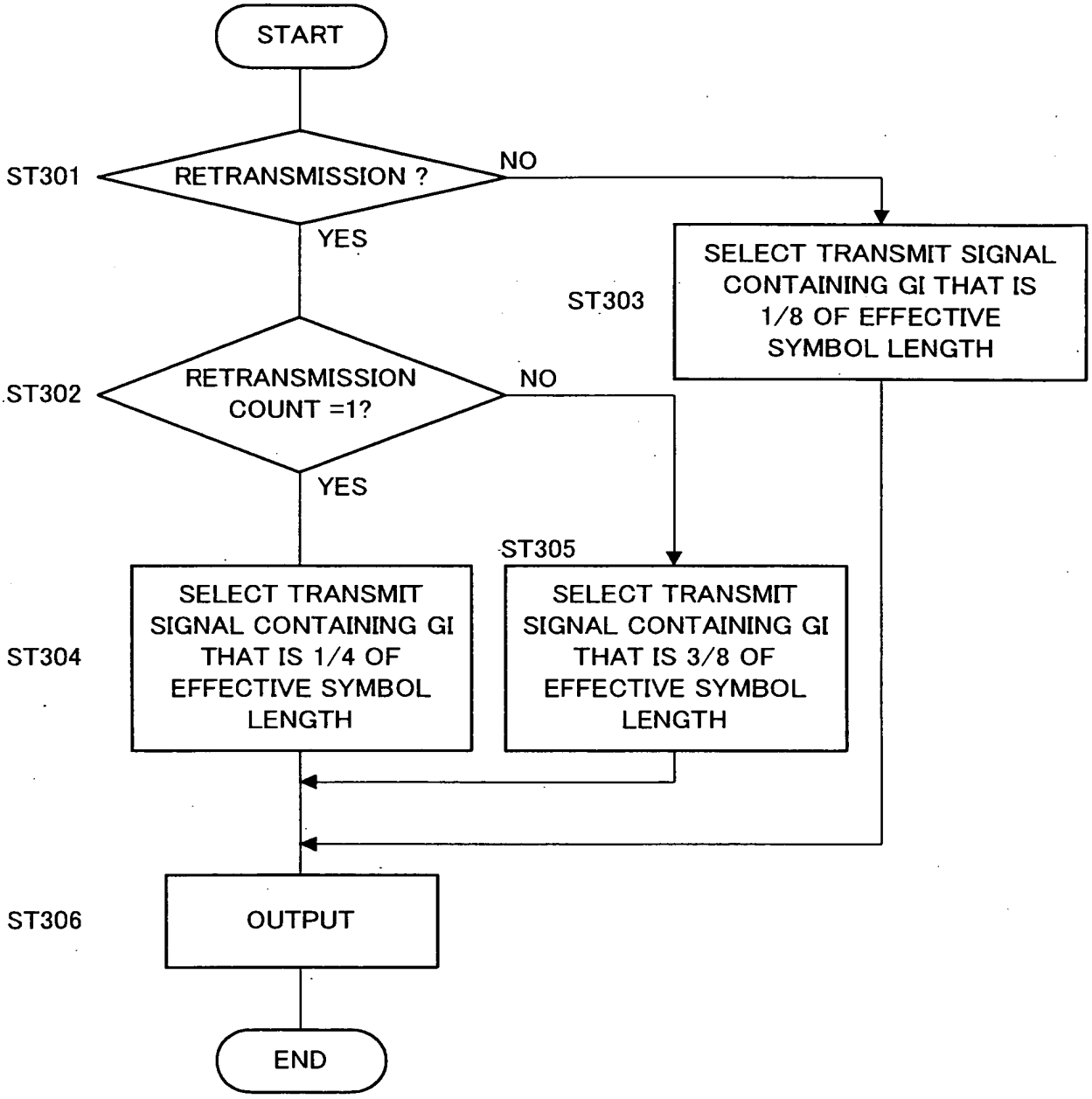
START
ST301
RETRANSMISSION ?
NO
YES
ST303
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/8 OF EFFECTIVE SYMBOL LENGTH
ST302
RETRANSMISSION COUNT =1?
NO
YES
ST305
ST304
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/4 OF EFFECTIVE SYMBOL LENGTH
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 3/8 OF EFFECTIVE SYMBOL LENGTH
ST306
OUTPUT
END

FIG.3

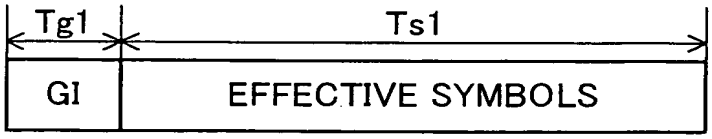

FIG.4

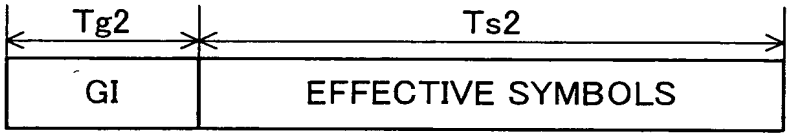

FIG.5

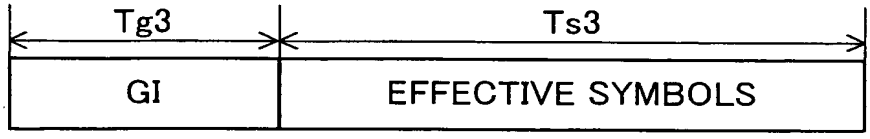

FIG.6

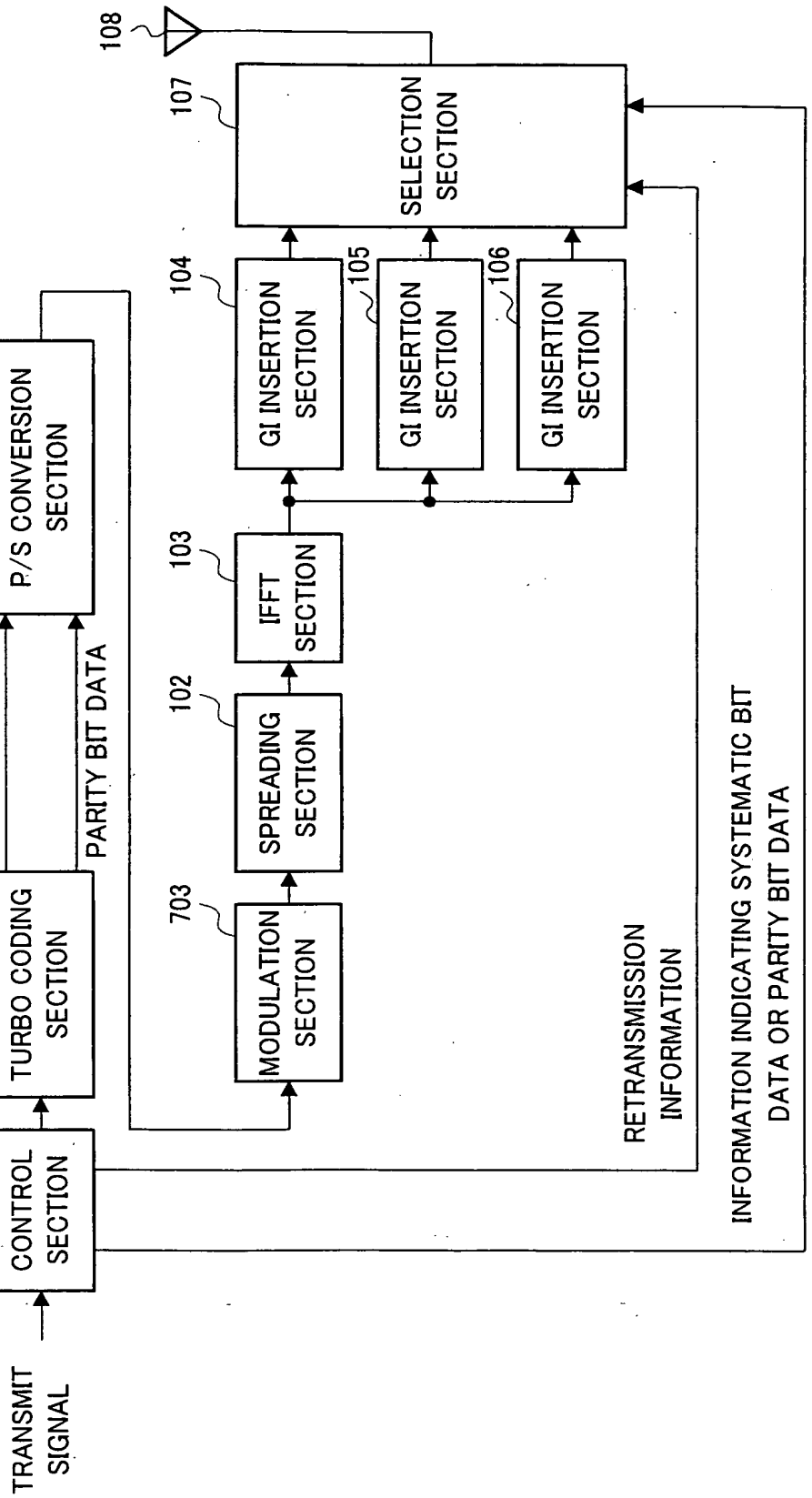
700
101
CONTROL SECTION
701
TURBO CODING SECTION
SYSTEMATIC BIT DATA
PARITY BIT DATA
702
P/S CONVERSION SECTION
703
MODULATION SECTION
102
SPREADING SECTION
103
IFFT SECTION
104
GI INSERTION SECTION
105
GI INSERTION SECTION
106
GI INSERTION SECTION
107
SELECTION SECTION
108
TRANSMIT SIGNAL
RETRANSMISSION INFORMATION
INFORMATION INDICATING SYSTEMATIC BIT DATA OR PARITY BIT DATA

FIG.7

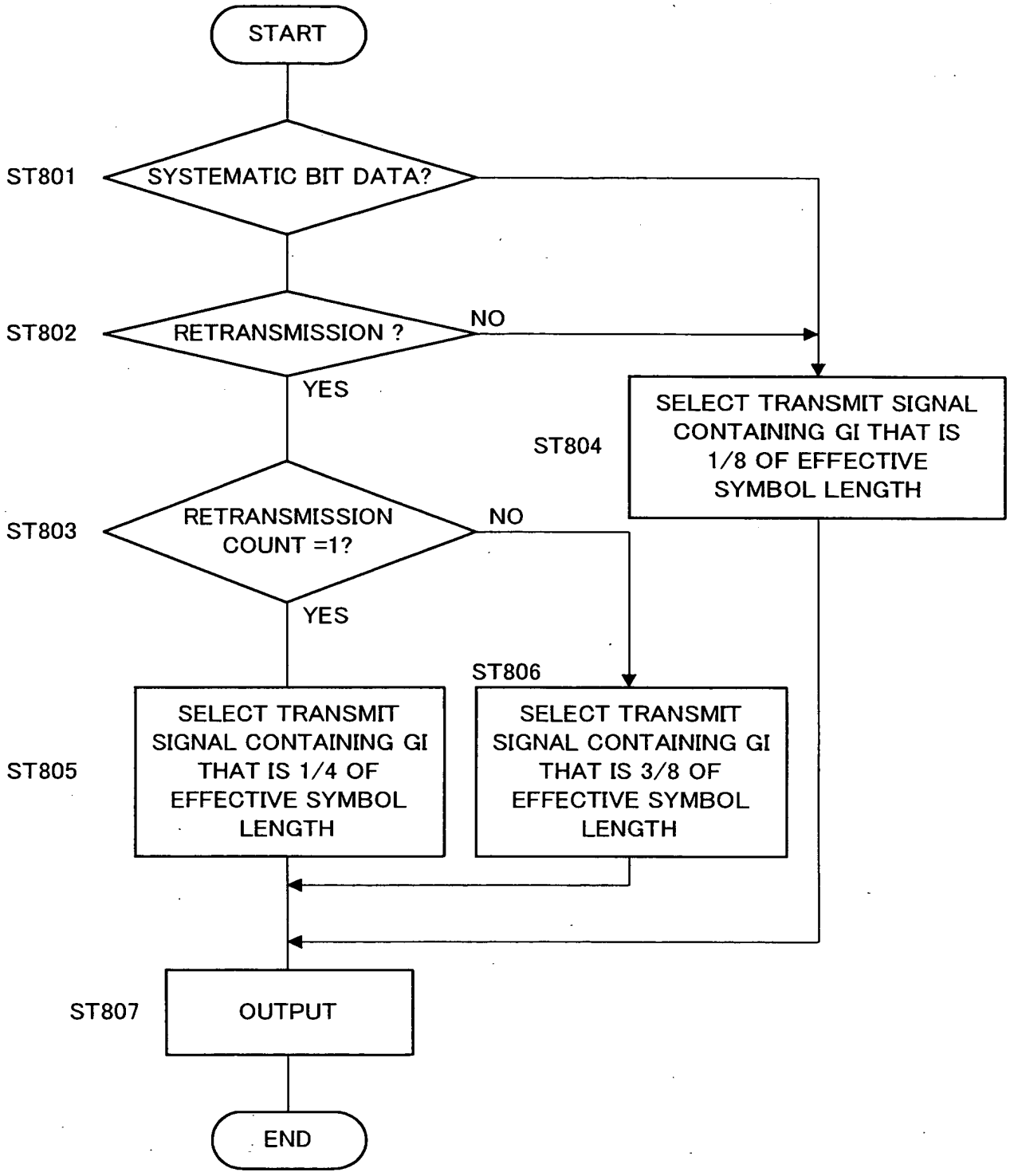
START
ST801
SYSTEMATIC BIT DATA?
ST802
RETRANSMISSION ?
NO
YES
ST804
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/8 OF EFFECTIVE SYMBOL LENGTH
ST803
RETRANSMISSION COUNT =1?
NO
YES
ST806
ST805
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/4 OF EFFECTIVE SYMBOL LENGTH
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 3/8 OF EFFECTIVE SYMBOL LENGTH
ST807
OUTPUT
END

FIG.8

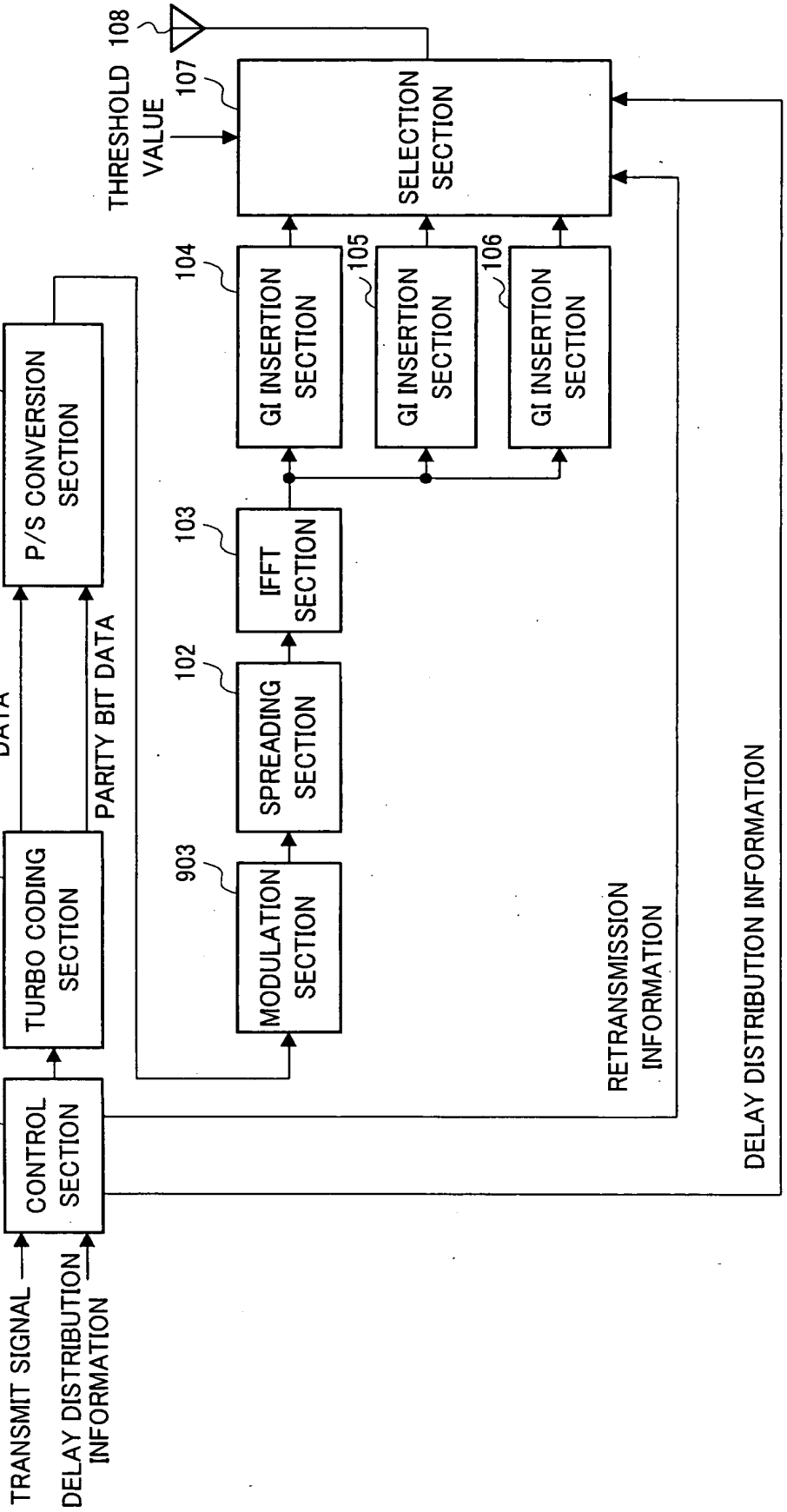
900
101
CONTROL SECTION
901
TURBO CODING SECTION
902
P/S CONVERSION SECTION
903
MODULATION SECTION
102
SPREADING SECTION
103
IFFT SECTION
104
GI INSERTION SECTION
105
GI INSERTION SECTION
106
GI INSERTION SECTION
107
SELECTION SECTION
108
THRESHOLD VALUE
TRANSMIT SIGNAL
DELAY DISTRIBUTION INFORMATION
SYSTEMATIC BIT DATA
PARITY BIT DATA
RETRANSMISSION INFORMATION
DELAY DISTRIBUTION INFORMATION

FIG.9

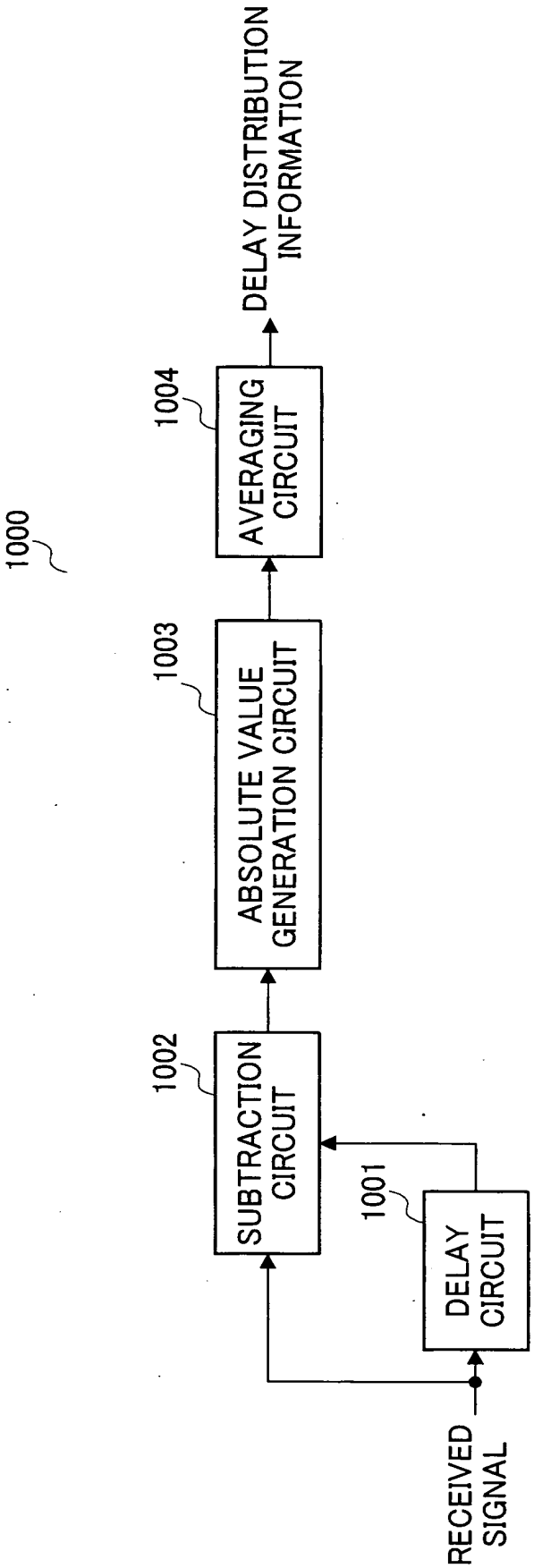
1000
RECEIVED SIGNAL
DELAY CIRCUIT
1001
SUBTRACTION CIRCUIT
1002
ABSOLUTE VALUE GENERATION CIRCUIT
1003
AVERAGING CIRCUIT
1004
DELAY DISTRIBUTION INFORMATION

FIG.10

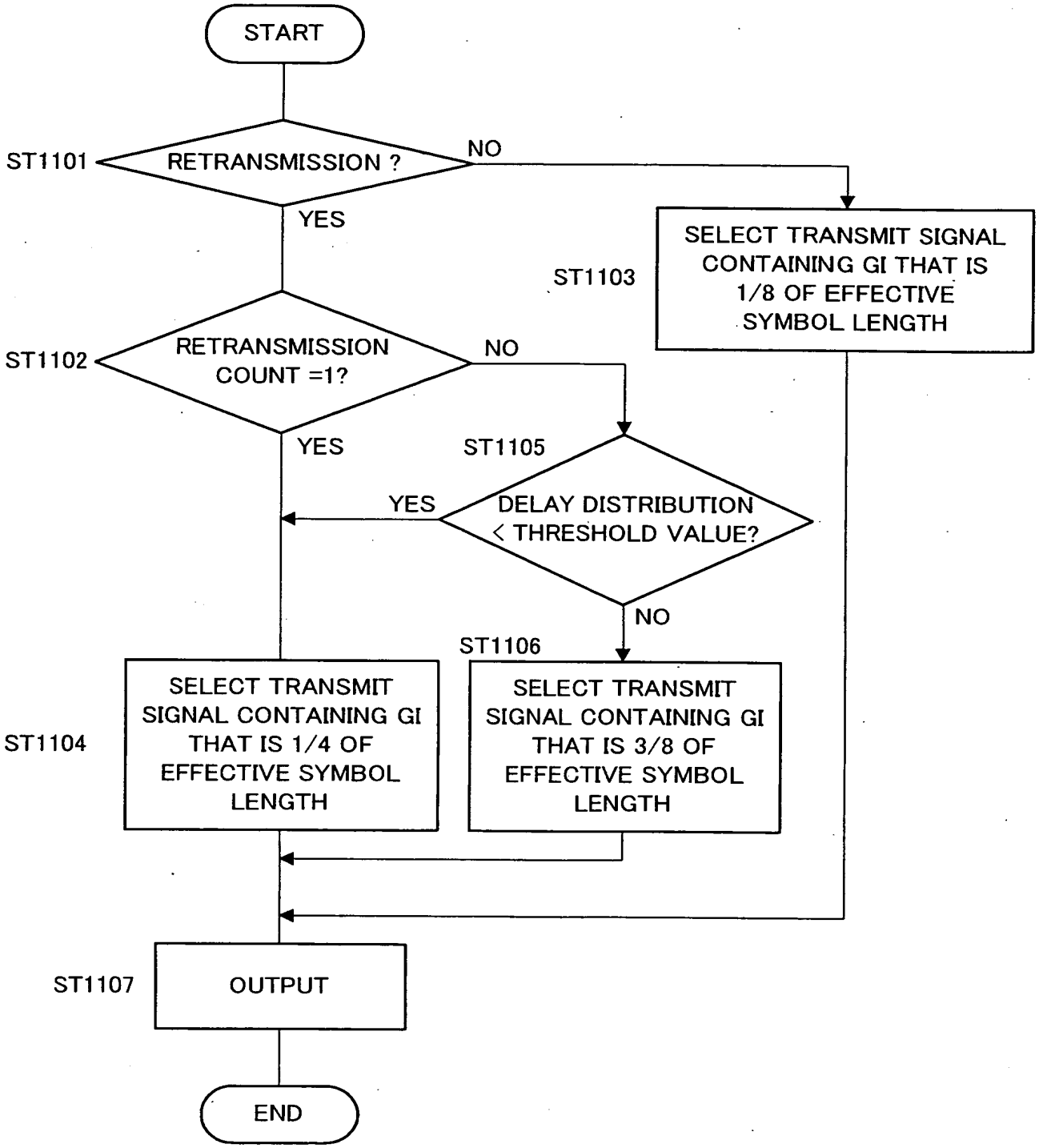
START
ST1101
RETRANSMISSION ?
NO
YES
ST1103
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/8 OF EFFECTIVE SYMBOL LENGTH
ST1102
RETRANSMISSION COUNT =1?
NO
YES
ST1105
YES
DELAY DISTRIBUTION < THRESHOLD VALUE?
NO
ST1106
ST1104
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/4 OF EFFECTIVE SYMBOL LENGTH
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 3/8 OF EFFECTIVE SYMBOL LENGTH
ST1107
OUTPUT
END

FIG.11

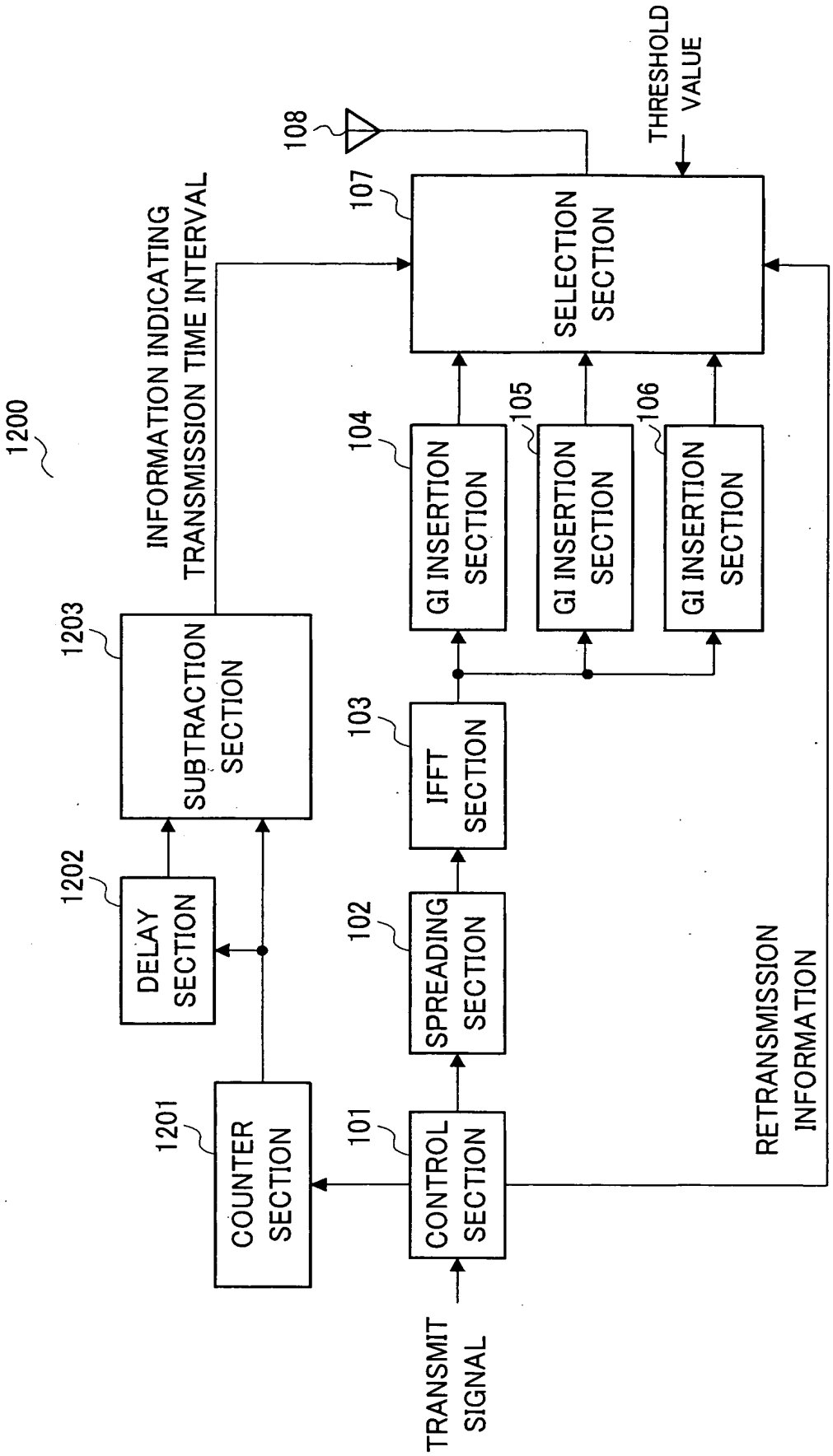
1200
INFORMATION INDICATING TRANSMISSION TIME INTERVAL
108
THRESHOLD VALUE
107
SELECTION SECTION
104
GI INSERTION SECTION
105
GI INSERTION SECTION
106
GI INSERTION SECTION
1203
SUBTRACTION SECTION
103
IFFT SECTION
1202
DELAY SECTION
102
SPREADING SECTION
1201
COUNTER SECTION
101
CONTROL SECTION
RETRANSMISSION INFORMATION
TRANSMIT SIGNAL

FIG.12

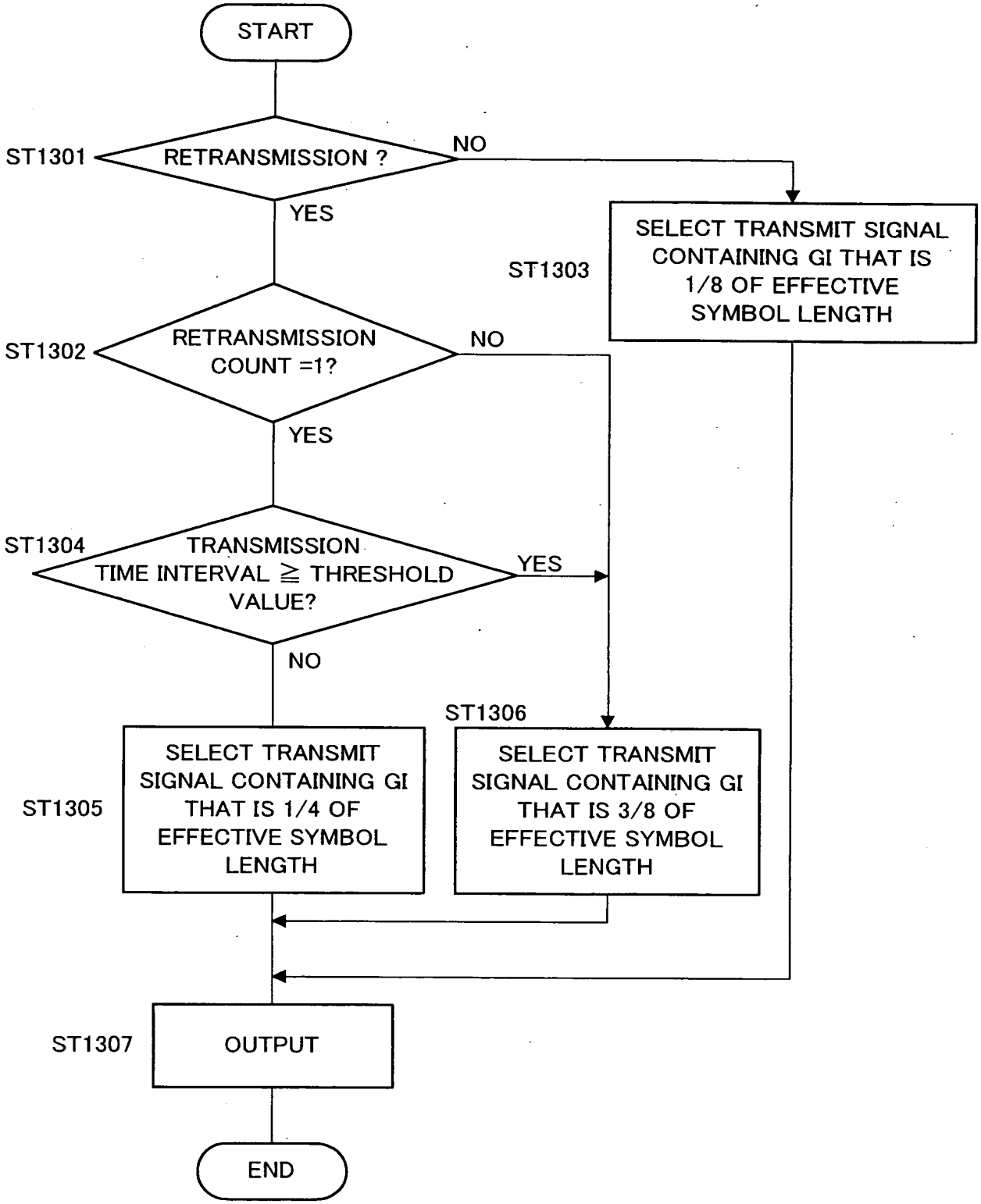
START
ST1301
RETRANSMISSION ?
NO
YES
ST1303
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/8 OF EFFECTIVE SYMBOL LENGTH
ST1302
RETRANSMISSION COUNT =1?
NO
YES
ST1304
TRANSMISSION TIME INTERVAL ≧ THRESHOLD VALUE?
YES
NO
ST1306
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 3/8 OF EFFECTIVE SYMBOL LENGTH
ST1305
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/4 OF EFFECTIVE SYMBOL LENGTH
ST1307
OUTPUT
END

FIG.13

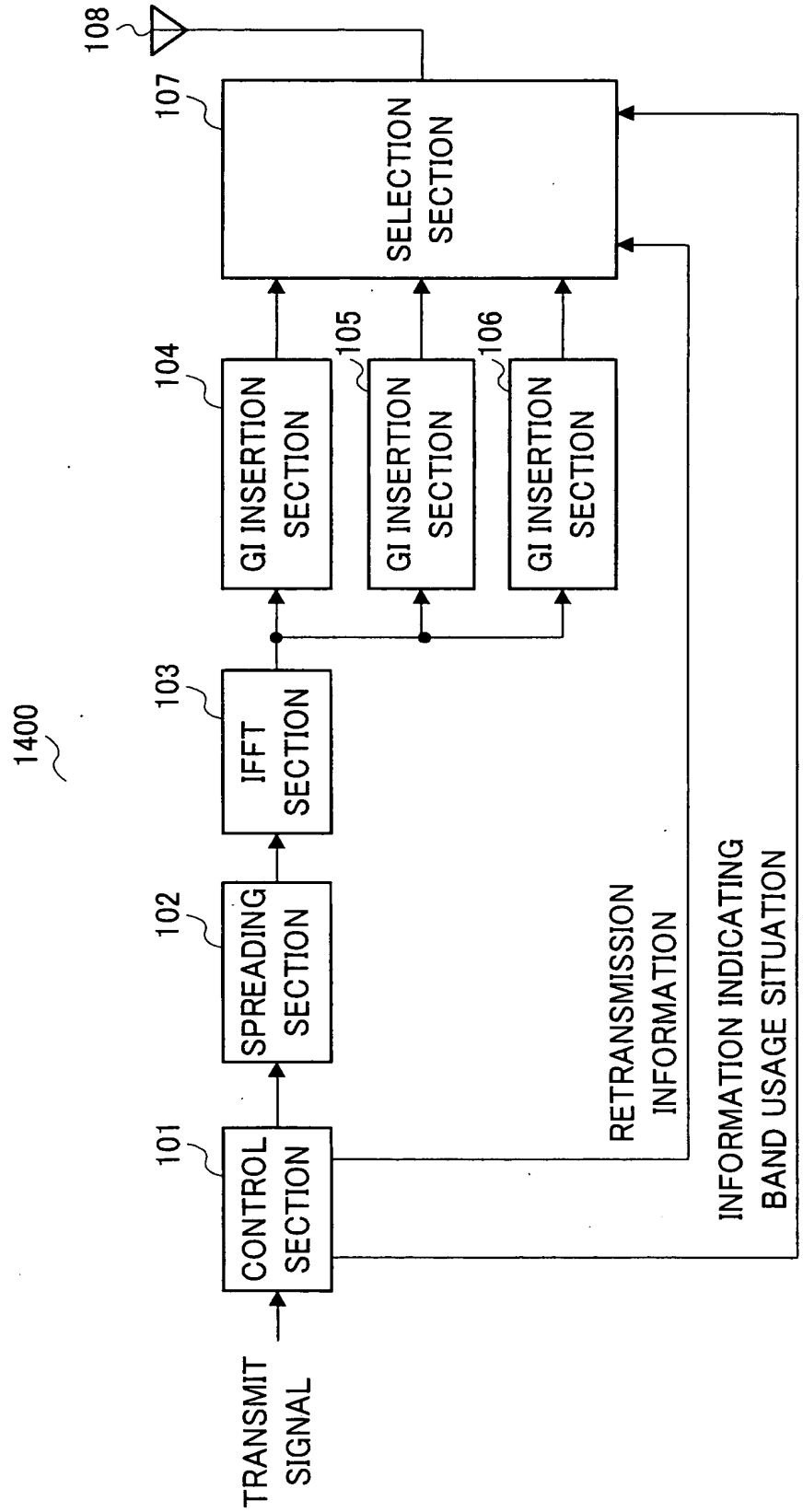
1400
TRANSMIT SIGNAL
101
CONTROL SECTION
102
SPREADING SECTION
103
IFFT SECTION
104
GI INSERTION SECTION
105
GI INSERTION SECTION
106
GI INSERTION SECTION
107
SELECTION SECTION
108
RETRANSMISSION INFORMATION
INFORMATION INDICATING BAND USAGE SITUATION

FIG.14

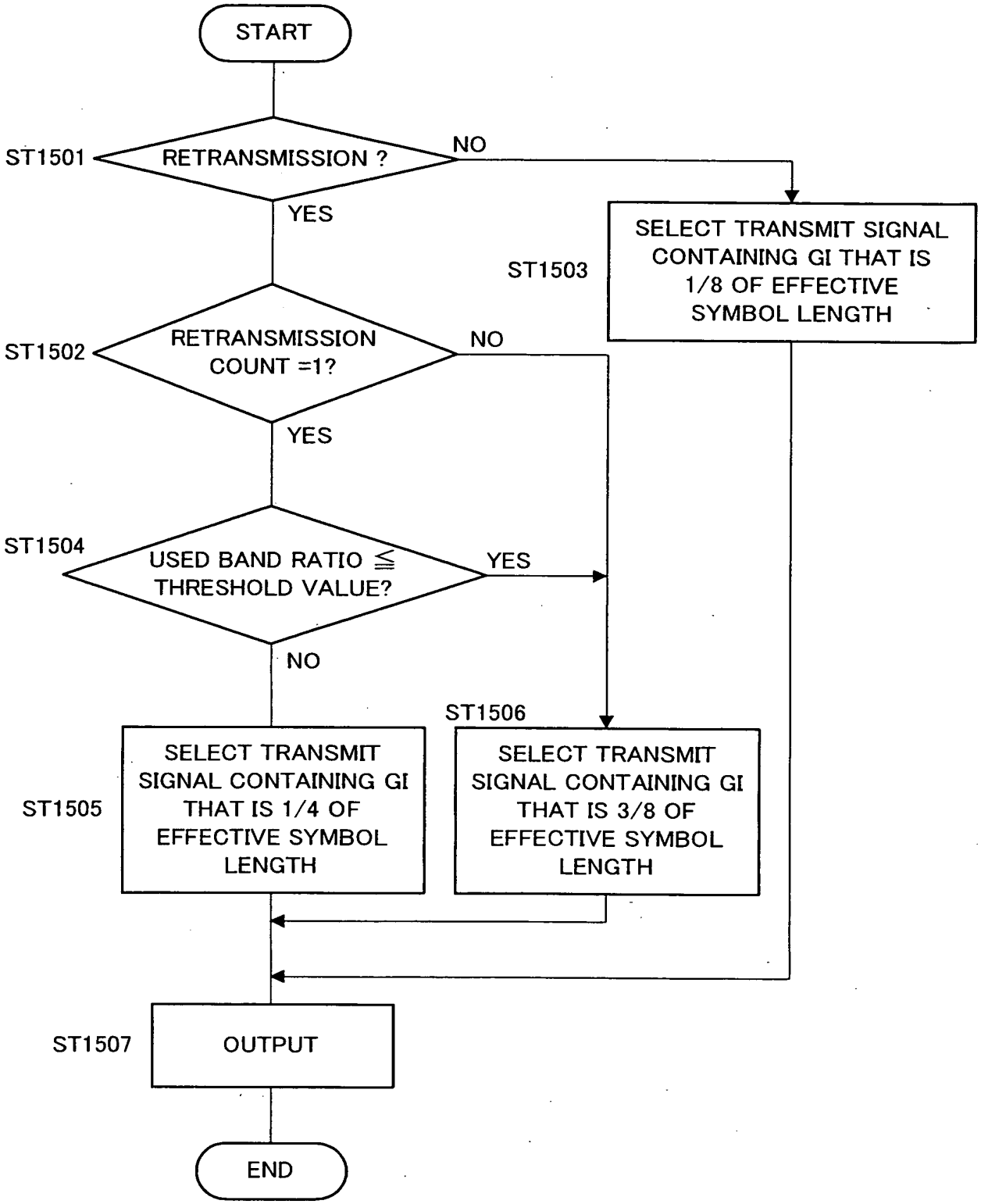
START
ST1501
RETRANSMISSION ?
NO
YES
ST1503
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/8 OF EFFECTIVE SYMBOL LENGTH
ST1502
RETRANSMISSION COUNT =1?
NO
YES
ST1504
USED BAND RATIO ≦ THRESHOLD VALUE?
YES
NO
ST1506
ST1505
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 1/4 OF EFFECTIVE SYMBOL LENGTH
SELECT TRANSMIT SIGNAL CONTAINING GI THAT IS 3/8 OF EFFECTIVE SYMBOL LENGTH
ST1507
OUTPUT
END

FIG.15

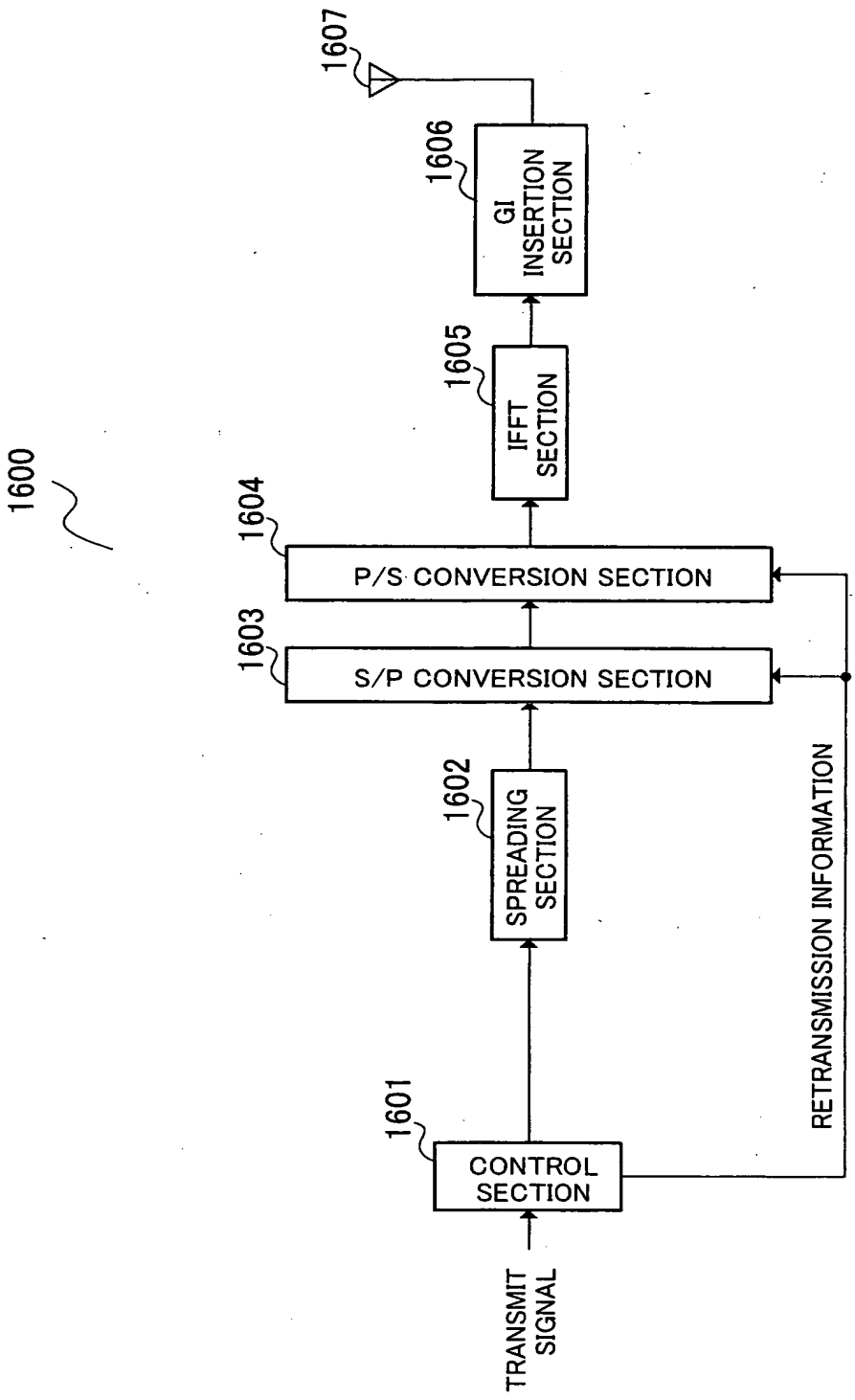
1600
1601
CONTROL SECTION
1602
SPREADING SECTION
1603
S/P CONVERSION SECTION
1604
P/S CONVERSION SECTION
1605
IFFT SECTION
1606
GI INSERTION SECTION
1607
TRANSMIT SIGNAL
RETRANSMISSION INFORMATION

FIG.16

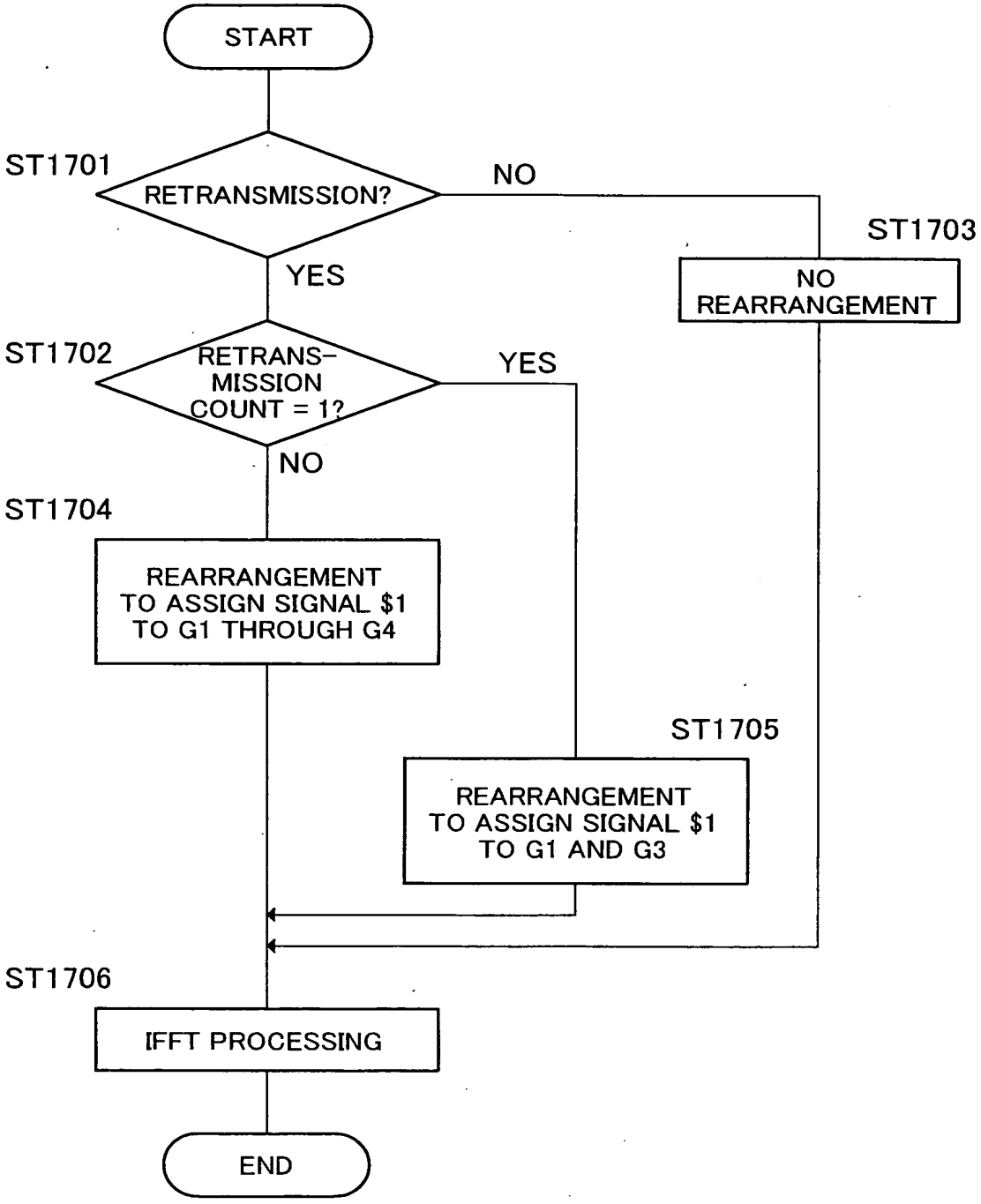
START
ST1701
RETRANSMISSION?
NO
ST1703
NO REARRANGEMENT
YES
ST1702
RETRANS-MISSION COUNT = 1?
YES
NO
ST1704
REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 THROUGH G4
ST1705
REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 AND G3
ST1706
IFFT PROCESSING
END

FIG.17

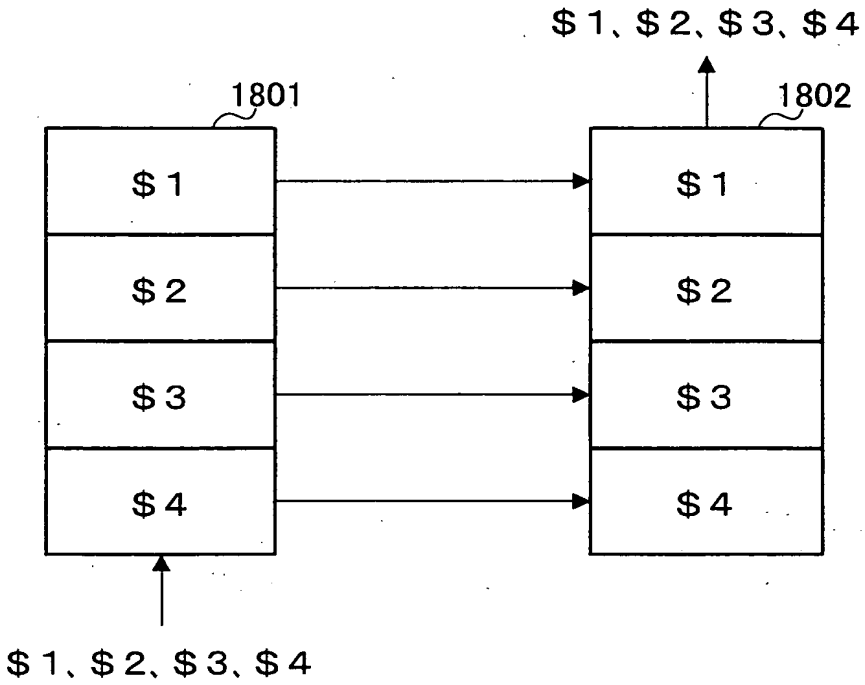

FIG.18

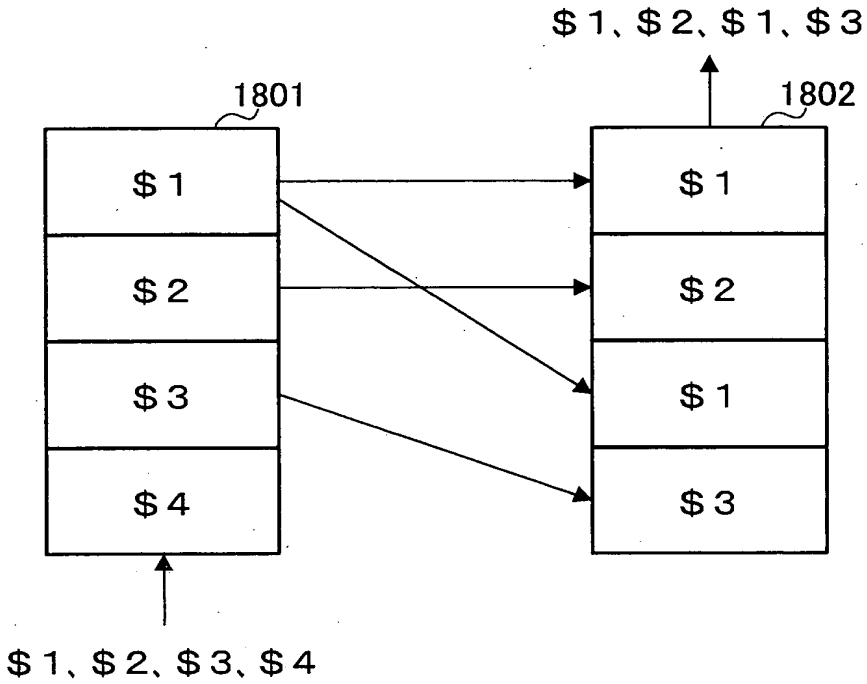

FIG.19

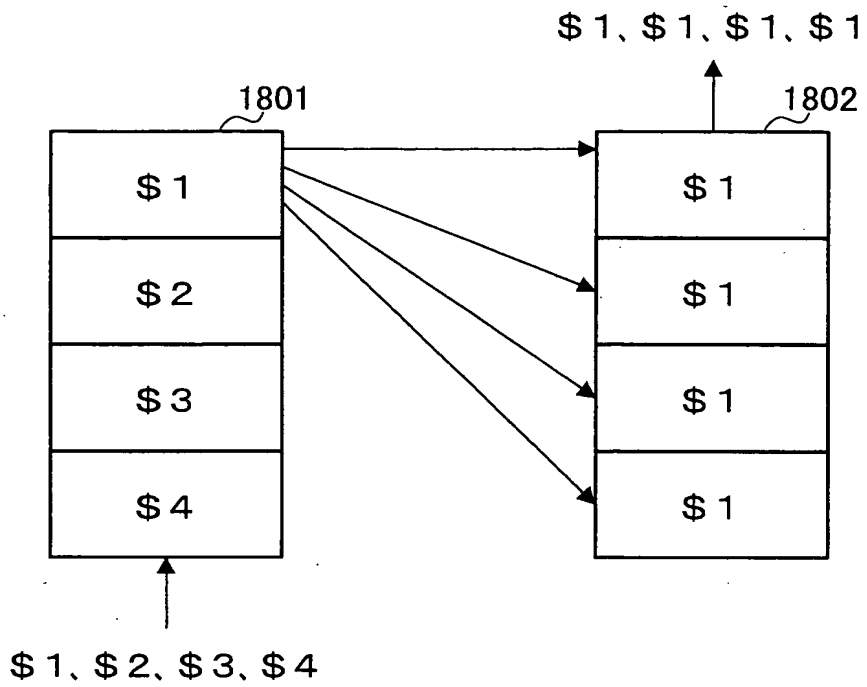

FIG.20

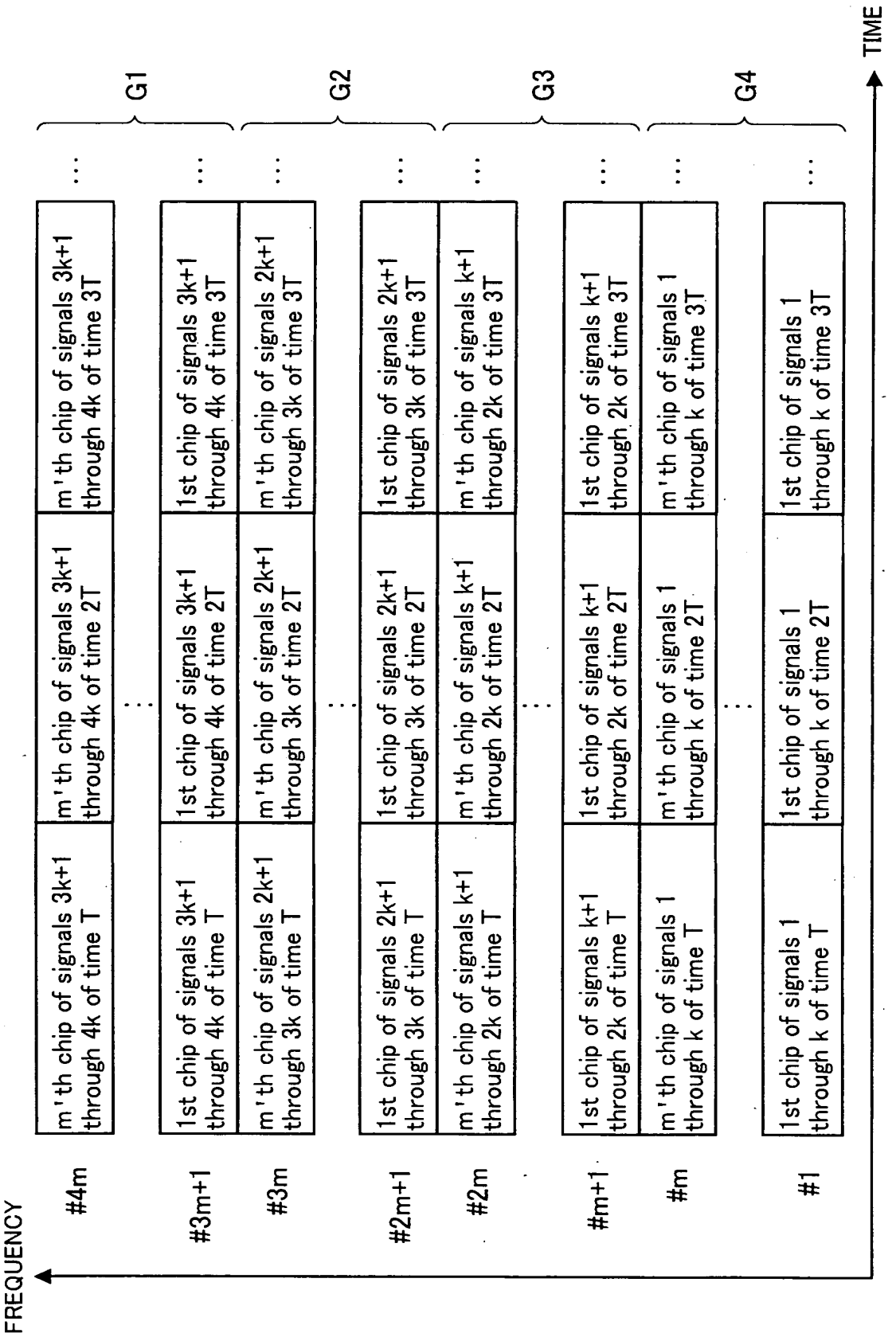
FREQUENCY
TIME
G1
G2
G3
G4
#4m
#3m+1
#3m
#2m+1
#2m
#m+1
#m
#1
m'th chip of signals 3k+1 through 4k of time T
m'th chip of signals 3k+1 through 4k of time 2T
m'th chip of signals 3k+1 through 4k of time 3T
1st chip of signals 3k+1 through 4k of time T
1st chip of signals 3k+1 through 4k of time 2T
1st chip of signals 3k+1 through 4k of time 3T
m'th chip of signals 2k+1 through 3k of time T
m'th chip of signals 2k+1 through 3k of time 2T
m'th chip of signals 2k+1 through 3k of time 3T
1st chip of signals 2k+1 through 3k of time T
1st chip of signals 2k+1 through 3k of time 2T
1st chip of signals 2k+1 through 3k of time 3T
m'th chip of signals k+1 through 2k of time T
m'th chip of signals k+1 through 2k of time 2T
m'th chip of signals k+1 through 2k of time 3T
1st chip of signals k+1 through 2k of time T
1st chip of signals k+1 through 2k of time 2T
1st chip of signals k+1 through 2k of time 3T
m'th chip of signals 1 through k of time T
m'th chip of signals 1 through k of time 2T
m'th chip of signals 1 through k of time 3T
1st chip of signals 1 through k of time T
1st chip of signals 1 through k of time 2T
1st chip of signals 1 through k of time 3T

FIG.21

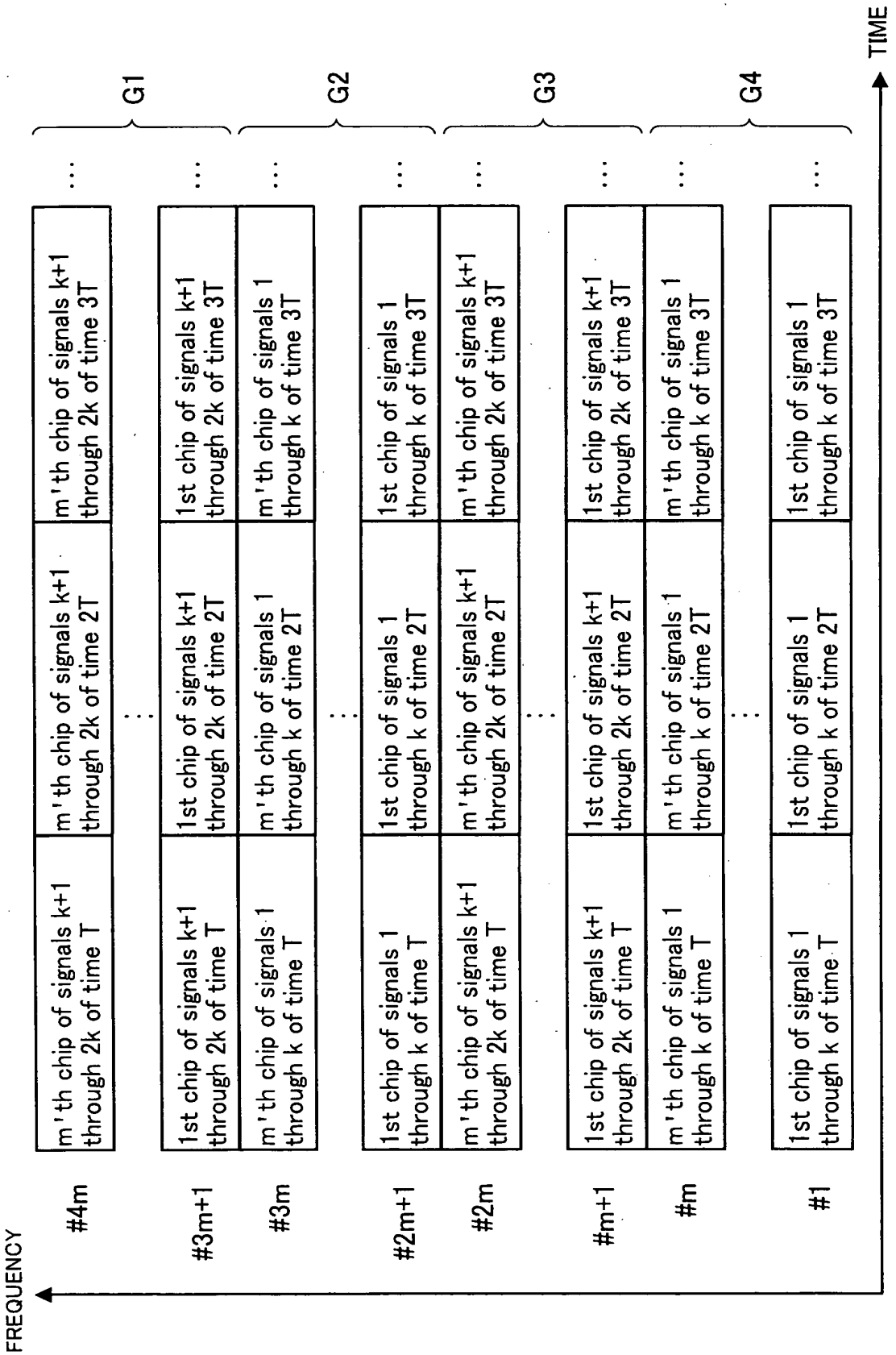
FREQUENCY
TIME
G1
G2
G3
G4
#4m
#3m+1
#3m
#2m+1
#2m
#m+1
#m
#1
m'th chip of signals k+1 through 2k of time T
m'th chip of signals k+1 through 2k of time 2T
m'th chip of signals k+1 through 2k of time 3T
1st chip of signals k+1 through 2k of time T
1st chip of signals k+1 through 2k of time 2T
1st chip of signals k+1 through 2k of time 3T
m'th chip of signals 1 through k of time T
m'th chip of signals 1 through k of time 2T
m'th chip of signals 1 through k of time 3T
1st chip of signals 1 through k of time T
1st chip of signals 1 through k of time 2T
1st chip of signals 1 through k of time 3T
m'th chip of signals k+1 through 2k of time T
m'th chip of signals k+1 through 2k of time 2T
m'th chip of signals k+1 through 2k of time 3T
1st chip of signals k+1 through 2k of time T
1st chip of signals k+1 through 2k of time 2T
1st chip of signals k+1 through 2k of time 3T
m'th chip of signals 1 through k of time T
m'th chip of signals 1 through k of time 2T
m'th chip of signals 1 through k of time 3T
1st chip of signals 1 through k of time T
1st chip of signals 1 through k of time 2T
1st chip of signals 1 through k of time 3T

FIG.22

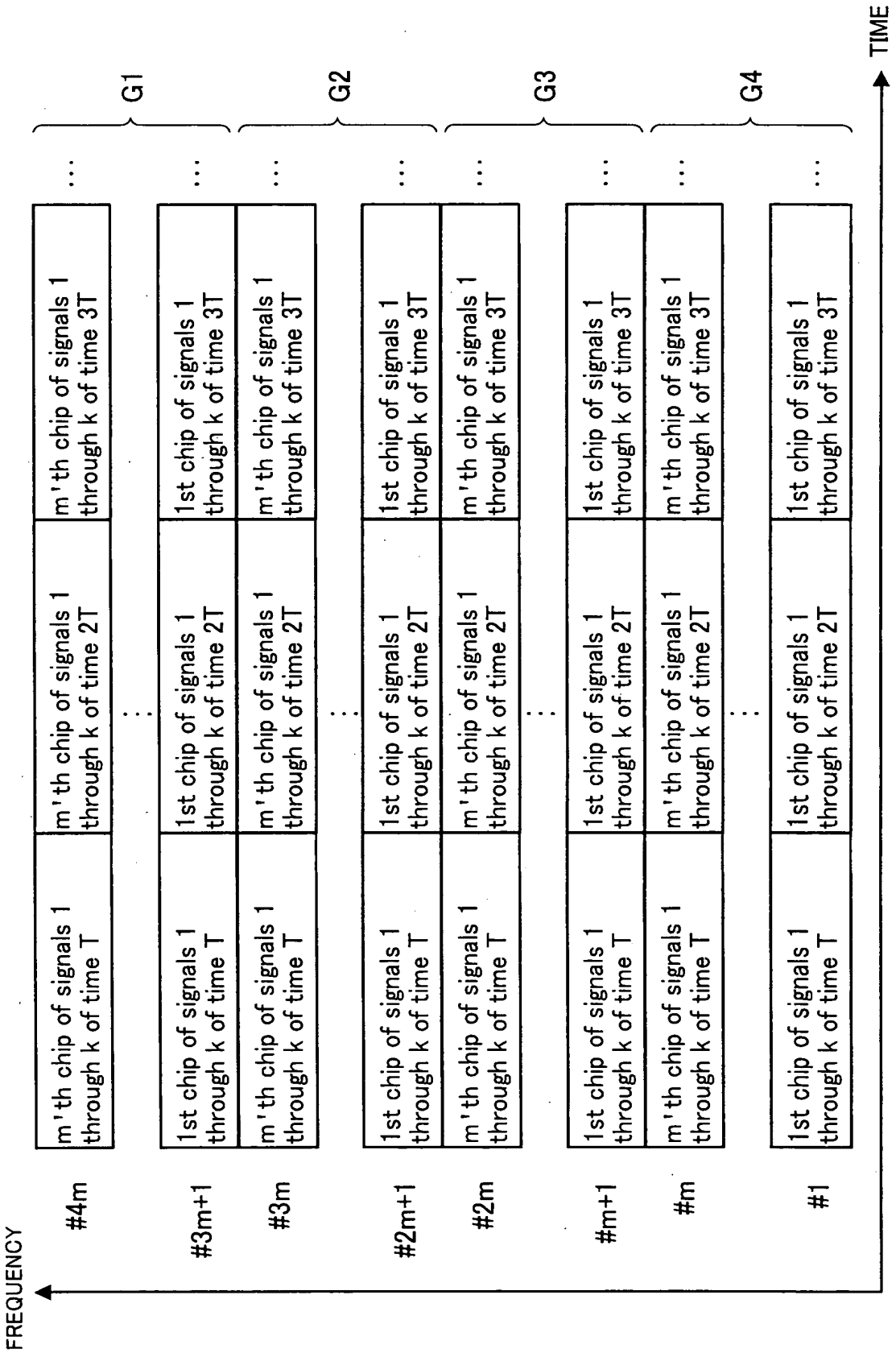
FREQUENCY
TIME
G1
G2
G3
G4
#4m
#3m+1
#3m
#2m+1
#2m
#m+1
#m
#1
m'th chip of signals 1 through k of time T
1st chip of signals 1 through k of time T
m'th chip of signals 1 through k of time 2T
1st chip of signals 1 through k of time 2T
m'th chip of signals 1 through k of time 3T
1st chip of signals 1 through k of time 3T

FIG.23

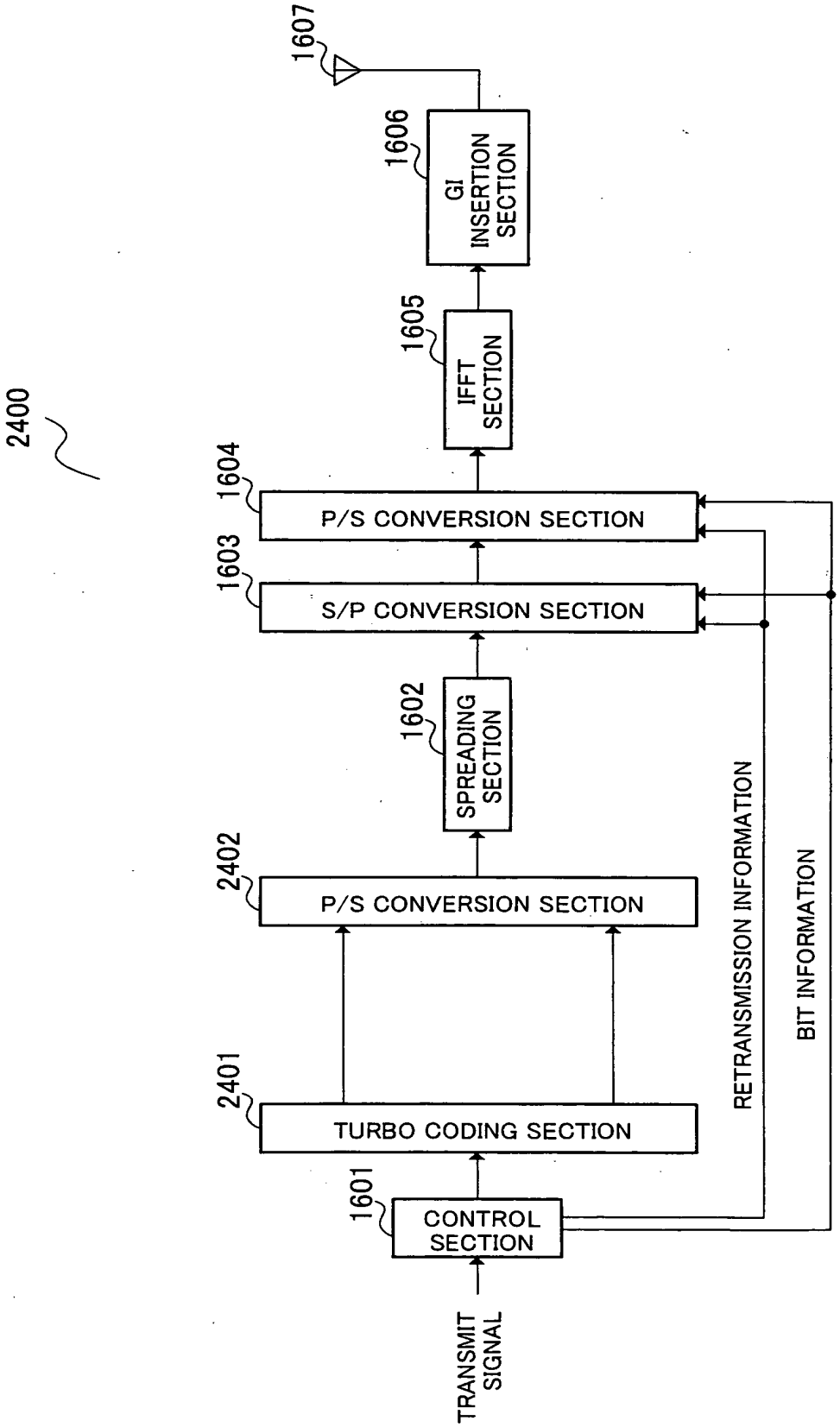
2400
1607
1606
GI INSERTION SECTION
1605
IFFT SECTION
1604
P/S CONVERSION SECTION
1603
S/P CONVERSION SECTION
1602
SPREADING SECTION
2402
P/S CONVERSION SECTION
2401
TURBO CODING SECTION
1601
CONTROL SECTION
TRANSMIT SIGNAL
RETRANSMISSION INFORMATION
BIT INFORMATION

FIG.24

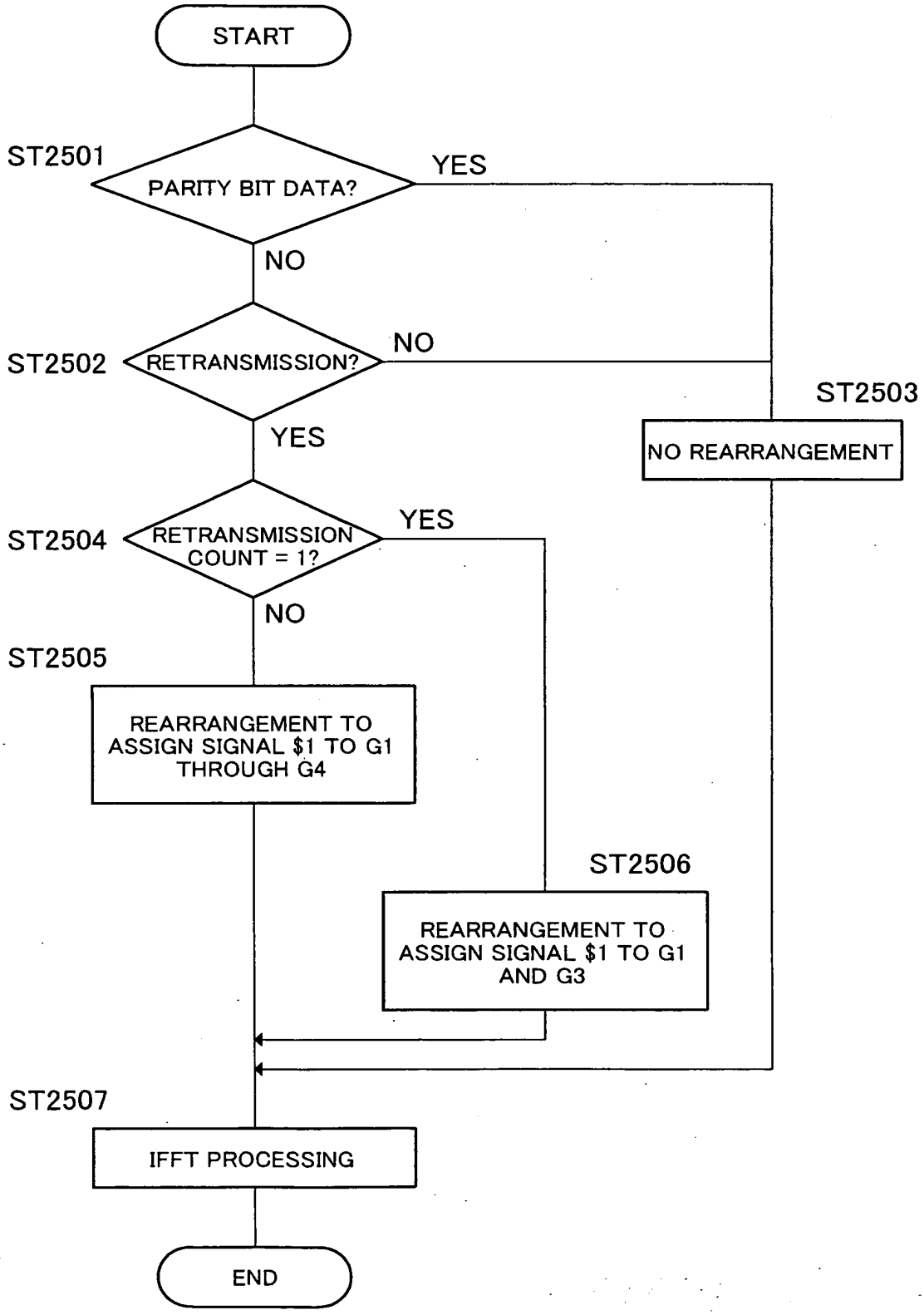
START
ST2501
PARITY BIT DATA?
YES
NO
ST2502
RETRANSMISSION?
NO
YES
ST2503
NO REARRANGEMENT
ST2504
RETRANSMISSION COUNT = 1?
YES
NO
ST2505
REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 THROUGH G4
ST2506
REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 AND G3
ST2507
IFFT PROCESSING
END

FIG.25

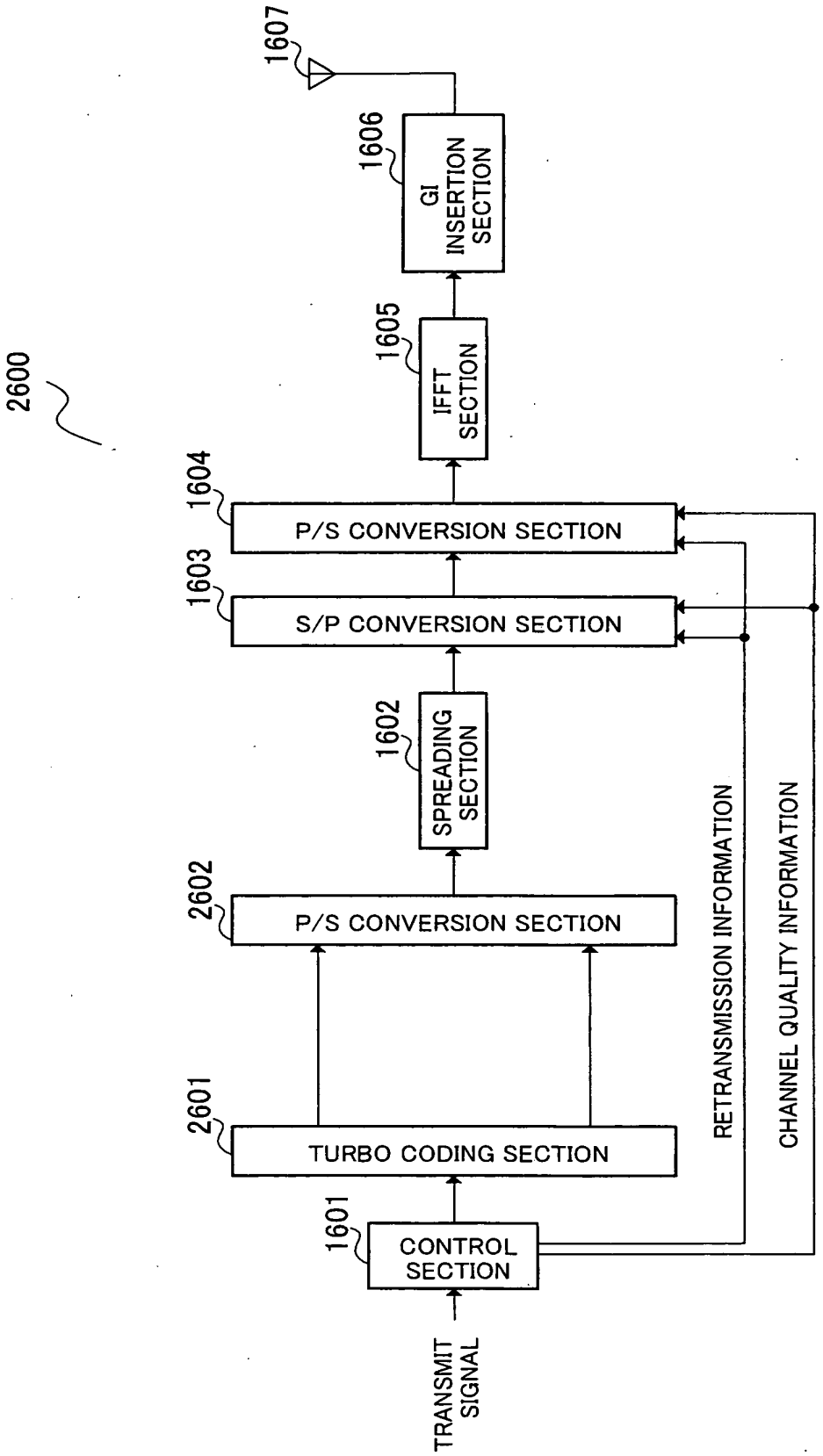
2600
1607
1606
GI INSERTION SECTION
1605
IFFT SECTION
1604
P/S CONVERSION SECTION
1603
S/P CONVERSION SECTION
1602
SPREADING SECTION
2602
P/S CONVERSION SECTION
2601
TURBO CODING SECTION
1601
CONTROL SECTION
TRANSMIT SIGNAL
RETRANSMISSION INFORMATION
CHANNEL QUALITY INFORMATION

FIG.26

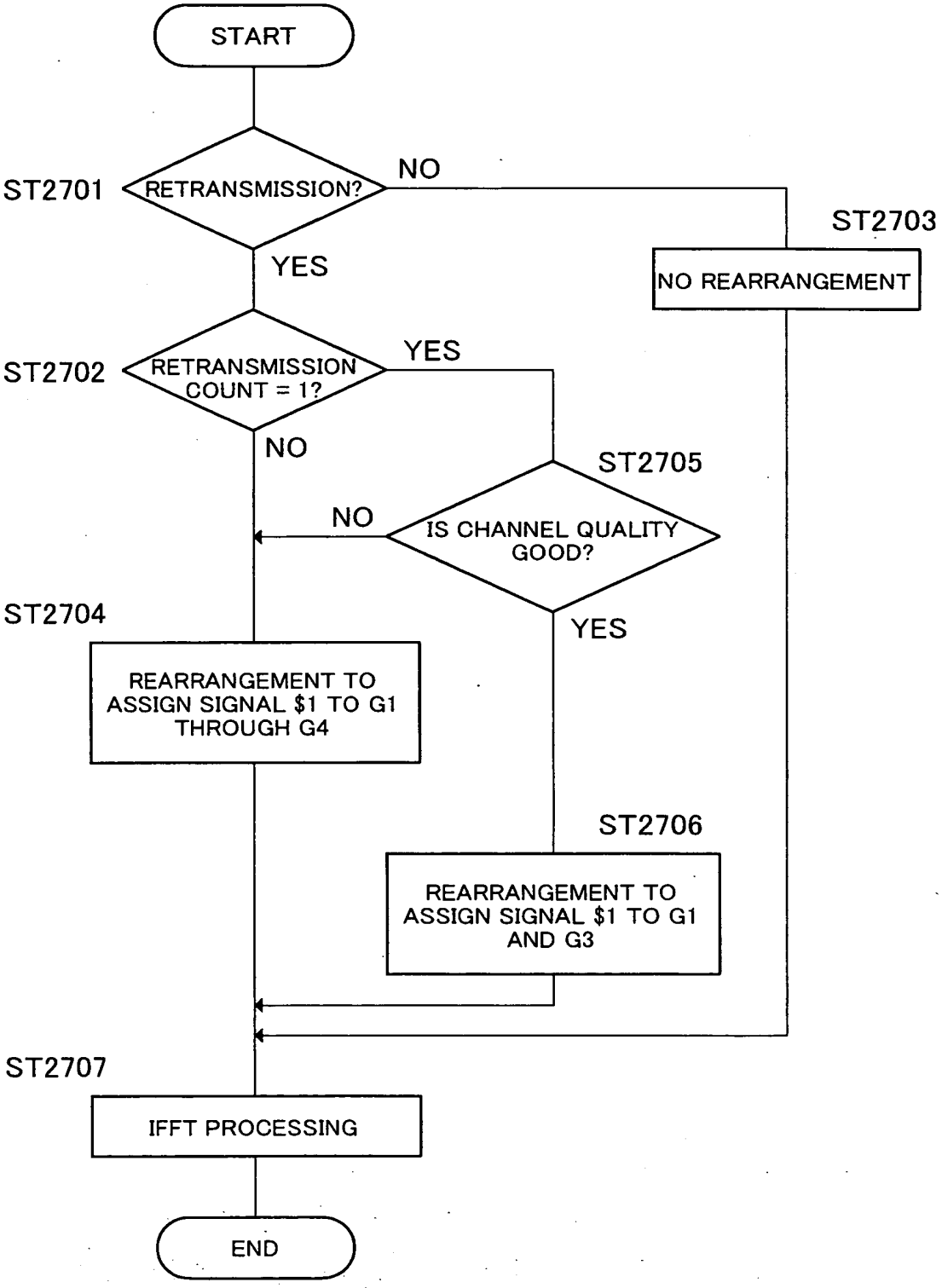
START
ST2701
RETRANSMISSION?
NO
YES
ST2703
NO REARRANGEMENT
ST2702
RETRANSMISSION COUNT = 1?
YES
NO
ST2705
NO
IS CHANNEL QUALITY GOOD?
YES
ST2704
REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 THROUGH G4
ST2706
REARRANGEMENT TO ASSIGN SIGNAL $1 TO G1 AND G3
ST2707
IFFT PROCESSING
END

FIG.27

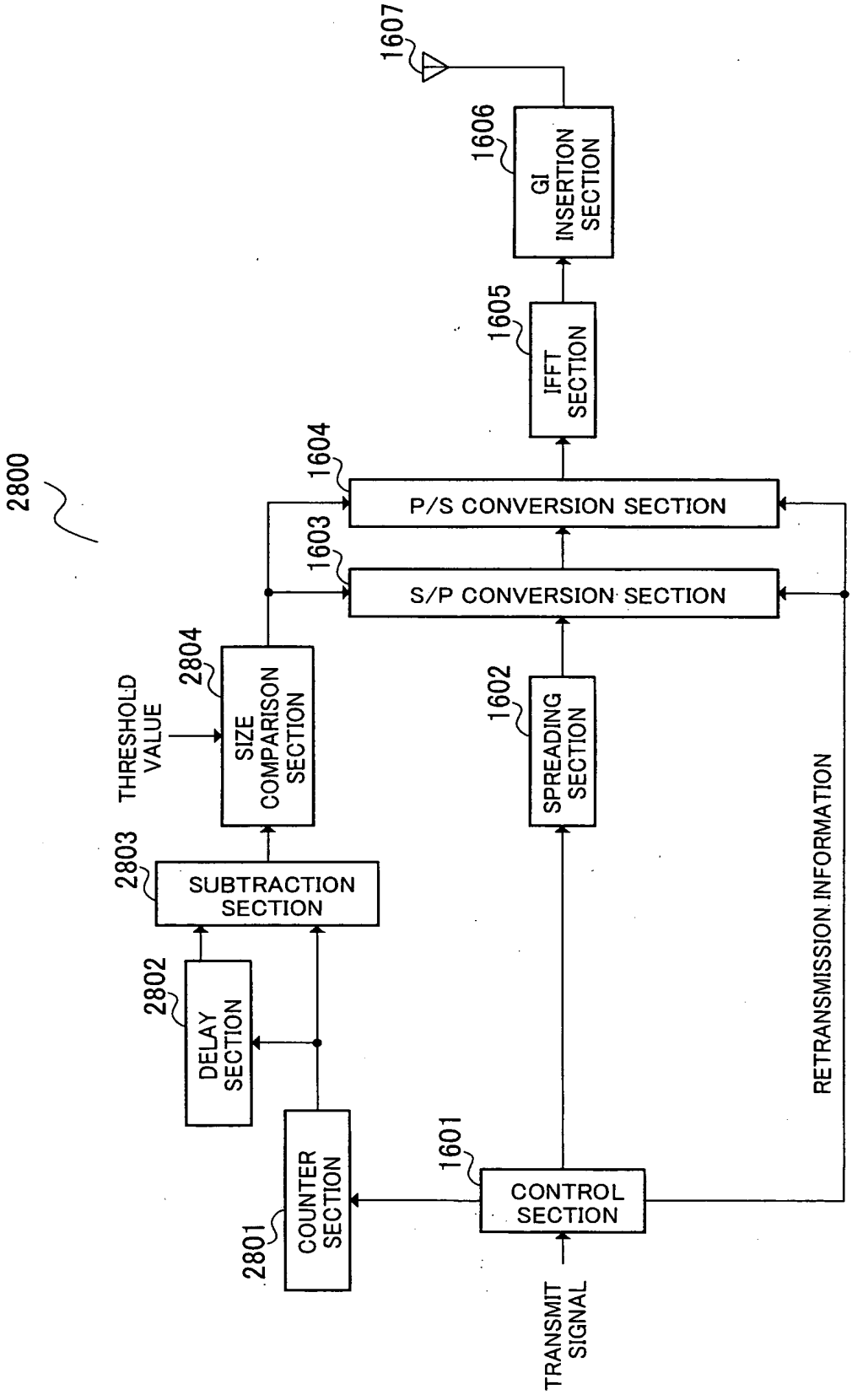
2800
1607
1606
GI INSERTION SECTION
1605
IFFT SECTION
1604
P/S CONVERSION SECTION
1603
S/P CONVERSION SECTION
2804
SIZE COMPARISON SECTION
THRESHOLD VALUE
1602
SPREADING SECTION
2803
SUBTRACTION SECTION
2802
DELAY SECTION
2801
COUNTER SECTION
1601
CONTROL SECTION
TRANSMIT SIGNAL
RETRANSMISSION INFORMATION

FIG.28

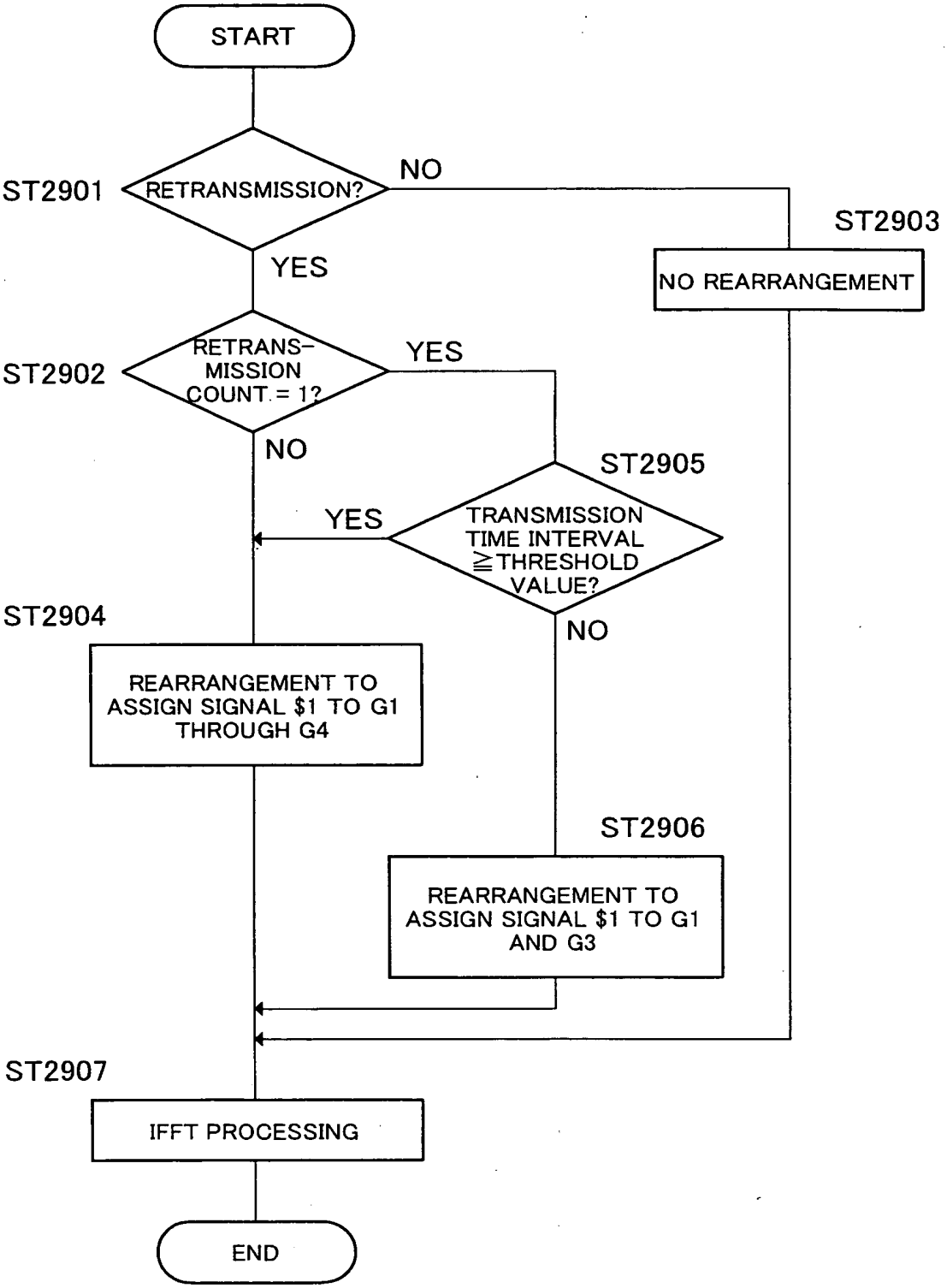
START
ST2901
RETRANSMISSION?
NO
YES
ST2903
NO REARRANGEMENT
ST2902
RETRANS-
MISSION
COUNT = 1?
YES
NO
ST2905
YES
TRANSMISSION
TIME INTERVAL
≧THRESHOLD
VALUE?
NO
ST2904
REARRANGEMENT TO
ASSIGN SIGNAL $1 TO G1
THROUGH G4
ST2906
REARRANGEMENT TO
ASSIGN SIGNAL $1 TO G1
AND G3
ST2907
IFFT PROCESSING
END

FIG.29

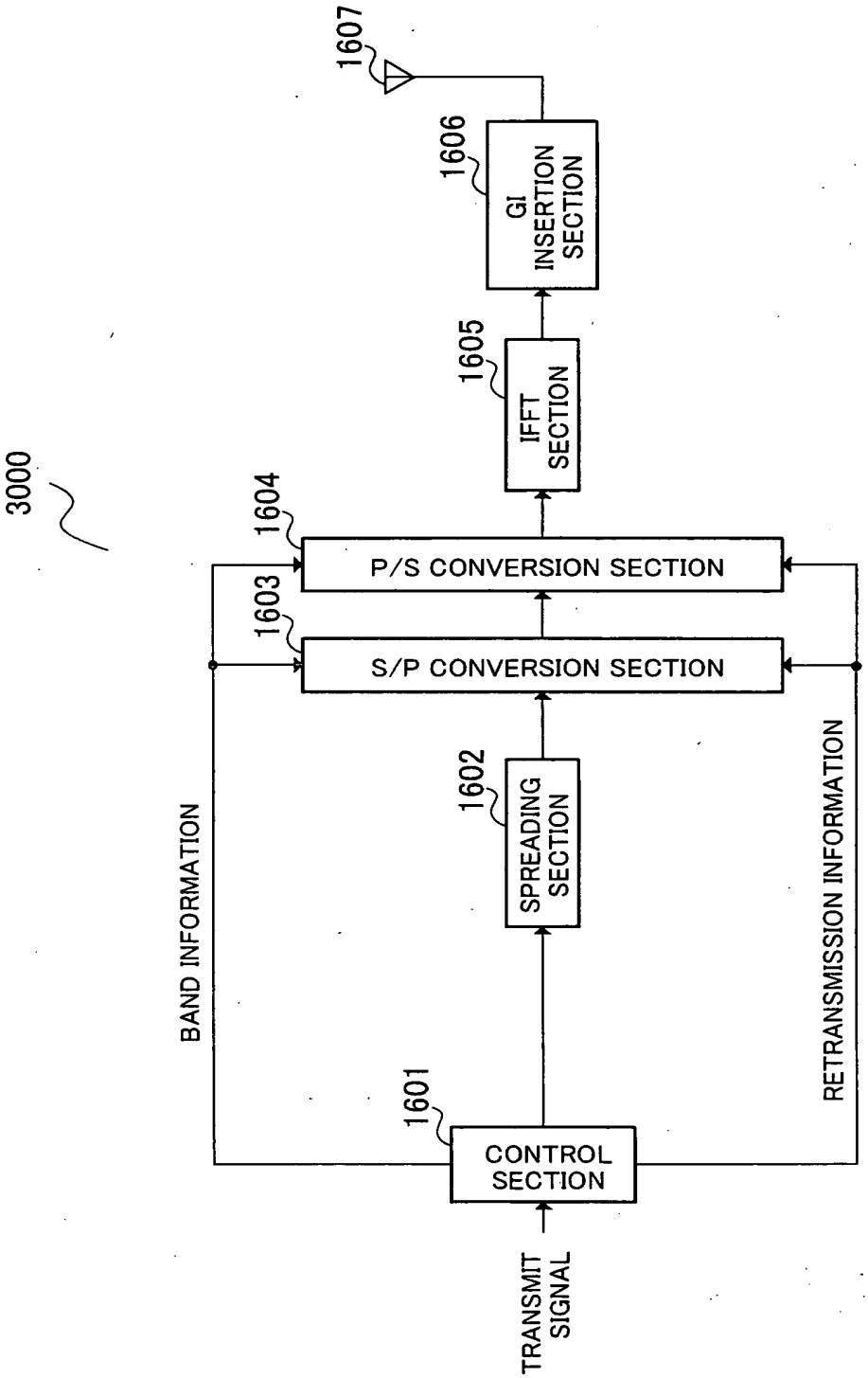
3000
1607
1606
GI INSERTION SECTION
1605
IFFT SECTION
1604
P/S CONVERSION SECTION
1603
S/P CONVERSION SECTION
1602
SPREADING SECTION
1601
CONTROL SECTION
BAND INFORMATION
RETRANSMISSION INFORMATION
TRANSMIT SIGNAL

FIG.30

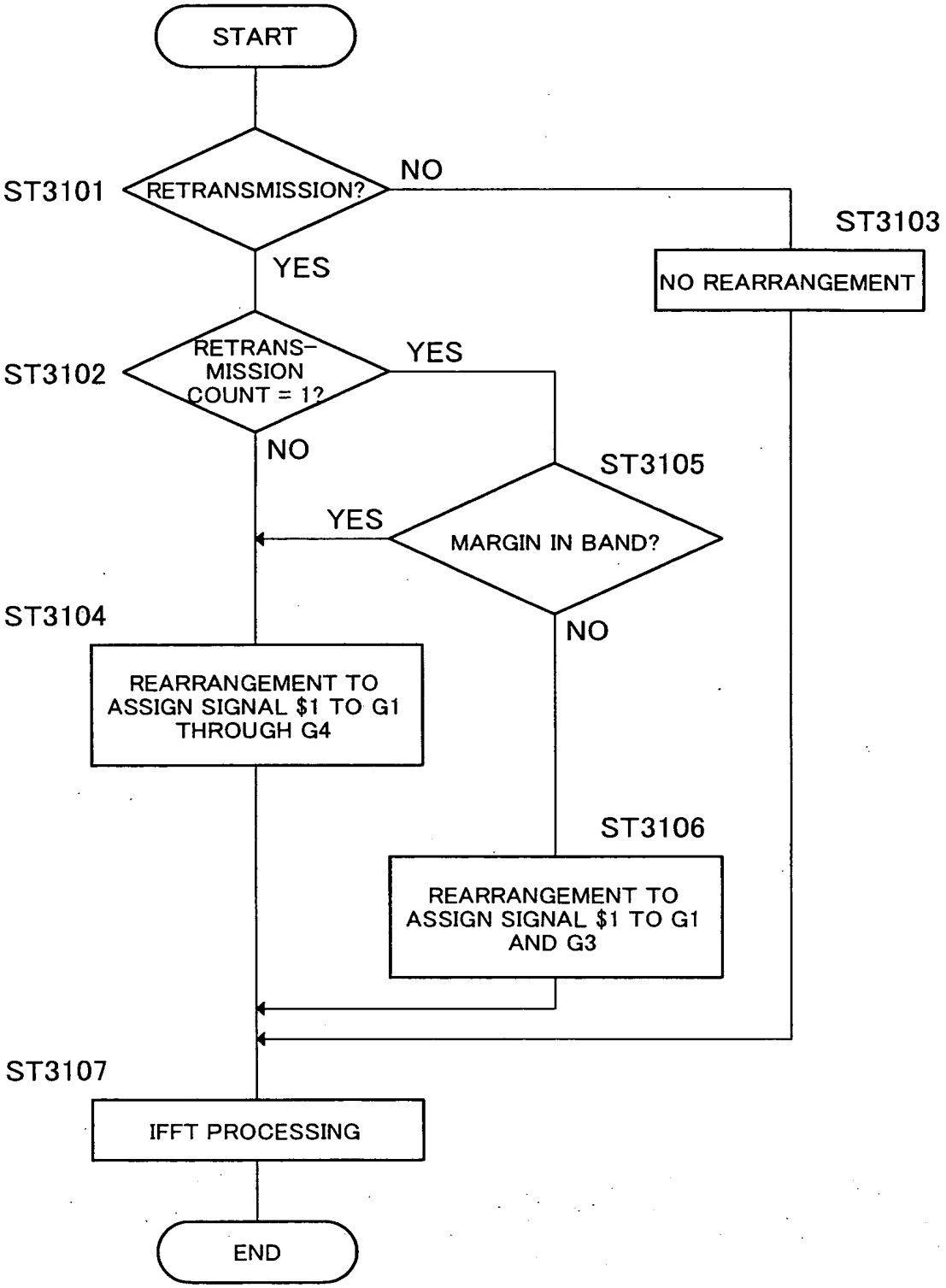
START
ST3101
RETRANSMISSION?
NO
ST3103
NO REARRANGEMENT
YES
ST3102
RETRANS-
MISSION
COUNT = 1?
YES
NO
ST3105
YES
MARGIN IN BAND?
NO
ST3104
REARRANGEMENT TO
ASSIGN SIGNAL $1 TO G1
THROUGH G4
ST3106
REARRANGEMENT TO
ASSIGN SIGNAL $1 TO G1
AND G3
ST3107
IFFT PROCESSING
END

FIG.31

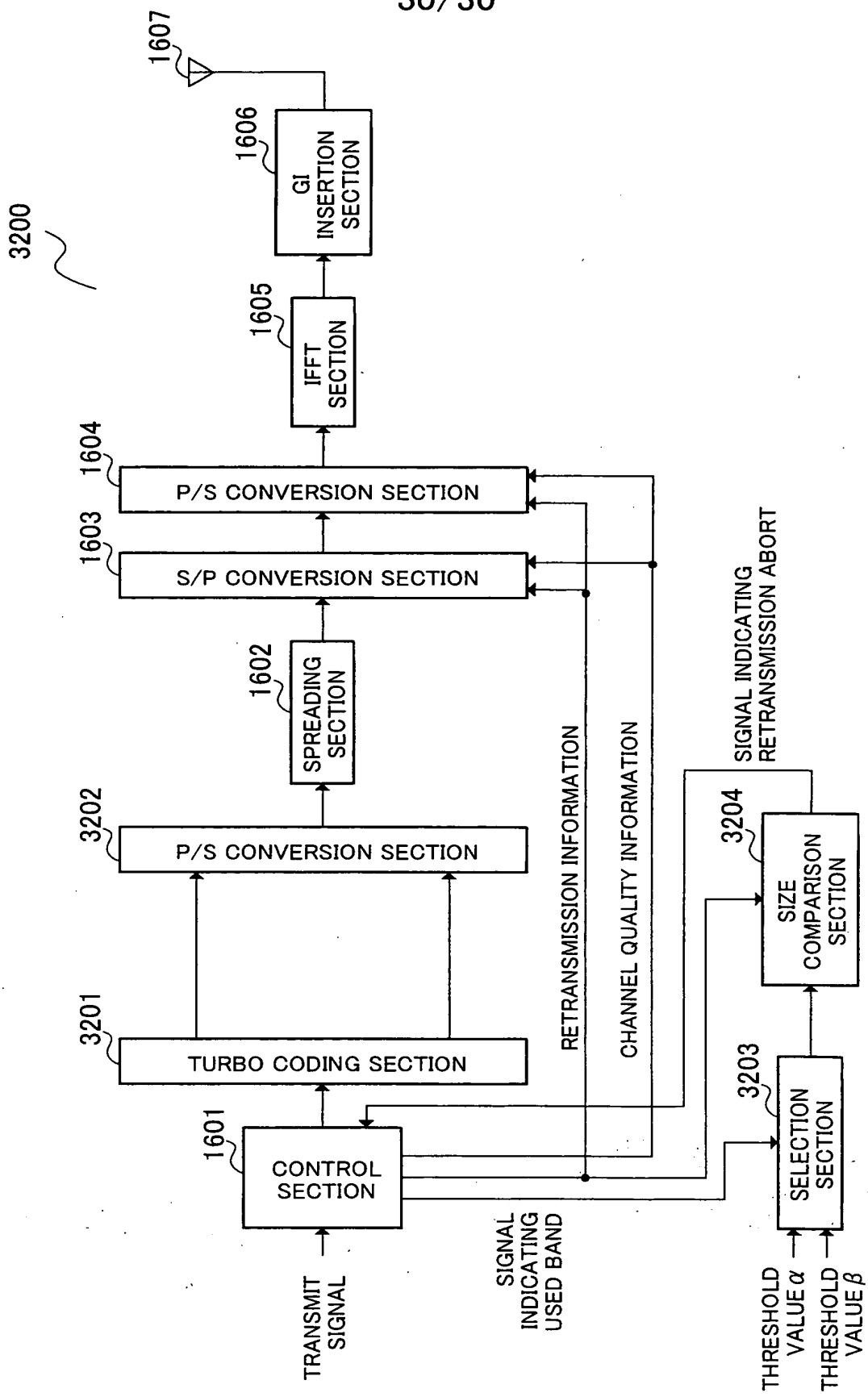
3200
1607
1606
GI INSERTION SECTION
1605
IFFT SECTION
1604
P/S CONVERSION SECTION
1603
S/P CONVERSION SECTION
1602
SPREADING SECTION
3202
P/S CONVERSION SECTION
3201
TURBO CODING SECTION
1601
CONTROL SECTION
3204
SIZE COMPARISON SECTION
3203
SELECTION SECTION
SIGNAL INDICATING RETRANSMISSION ABORT
RETRANSMISSION INFORMATION
CHANNEL QUALITY INFORMATION
TRANSMIT SIGNAL
SIGNAL INDICATING USED BAND
THRESHOLD VALUE α
THRESHOLD VALUE β

FIG.32